United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Massachusetts
Agricultural
Experiment Station

Soil Survey of Hampden and Hampshire Counties, Massachusetts, Eastern Part

How To Use This Soil Survey

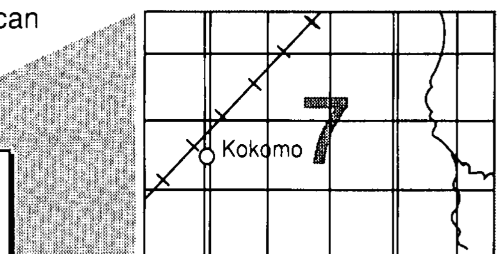
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

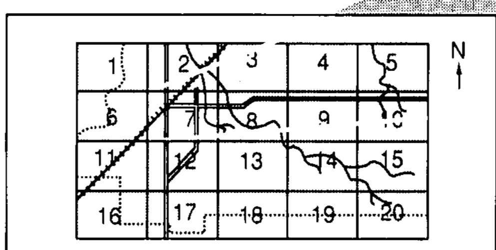
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



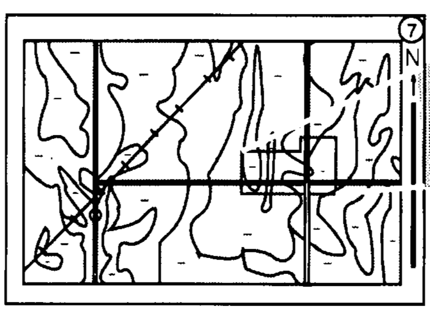
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

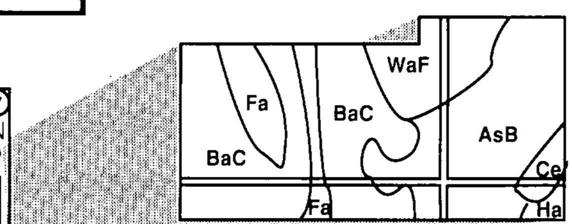


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This survey was made cooperatively by the Soil Conservation Service and the Massachusetts Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Hampden Conservation District and the Hampshire Conservation District. Part of the funding for this survey was provided by local units of government.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Apple orchard in an area of Paxton fine sandy loam, 3 to 8 percent slopes, very stony.

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Issued April 1989

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Preface

This soil survey contains information that can be used in land-planning programs in Hampden and Hampshire Counties. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Soil Survey of Hampden and Hampshire Counties, Massachusetts, Eastern Part

By Eric I. Swenson

Fieldwork by Peter C. Fletcher, James T. Krohelski, Richard J. Scanu, John R. Mott, and Eric I. Swenson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Massachusetts Agricultural Experiment Station

Hampden and Hampshire Counties are in the western part of Massachusetts (fig. 1). The part of these counties covered by this soil survey is the highland area east of the Connecticut River Valley. The survey area is 139,875 acres, or 218.6 square miles. There are about 68,535 acres in Hampden County and 71,340 acres in Hampshire County. The Swift, Quaboag, and Ware Rivers dominate the drainage system of the area. Elevation ranges from about 160 feet into Amherst to over 1,260 feet above sea level on Mount Pisgah in Wales.

This survey is an update to a soil survey of Hampden and Hampshire Counties published in 1932. It provides additional information and larger maps that show the soils in greater detail (*5*).

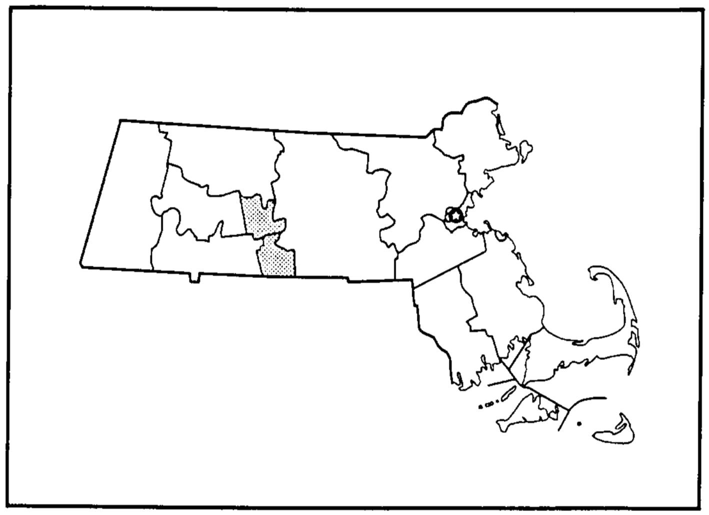

Figure 1.—Location of Hampden and Hampshire Counties, eastern part, in Massachusetts.

General Nature of the Survey Area

This section describes some of the cultural and natural factors that affect the use and characteristics of the soils in the survey area.

Climate

Winters are cold in the survey area, and summers are moderately warm with occasional hot spells. The mountains are markedly cooler than the main agricultural areas in the lowlands. Precipitation is well distributed throughout the year and is nearly always adequate for all crops. Winter snows occur frequently, occasionally as blizzards, and cover the ground much of the time.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Amherst, Massachusetts, for the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 26 degrees F, and the average daily minimum temperature is 16 degrees. The lowest temperature on record, which occurred at Amherst on January 22, 1961, is -30 degrees. In summer the average temperature is 69

degrees, and the average daily maximum temperature is 81 degrees. The highest recorded temperature, which occurred on July 26, 1963, is 99 degrees.

Growing degree days, shown in table 1, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 42 inches. Of this, about 22 inches, or more than 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 18 inches. The heaviest 1-day rainfall during the period of record was 4.14 inches at Amherst on August 18, 1955. Thunderstorms occur on about 21 days each year, and most occur in summer.

The average seasonal snowfall is 47 inches. The greatest snow depth at any one time during the period of record was 36 inches. On the average, 44 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 75 percent. The sun shines 65 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the west. Average windspeed is highest, 12 miles per hour, in spring.

Climatic data for this section were specially prepared for the Soil Conservation Service by the National Climatic Data Center, Asheville, North Carolina.

Natural Resources and Farm Products

Most of the survey area is in forests, and a strong cordwood market is in the area. Some areas are used for industrial and residential development. Sand and gravel are excavated in many places throughout the area for use as general construction material. The water resources in the survey area are used mainly for various types of water-based recreation and for some municipal water supplies. The main agricultural enterprises are apple orchards and dairy farms.

Geology

The soils of the survey area are underlain by Paleozoic intrusive rocks and metamorphosed sedimentary and volcanic rocks formed during the Silurian, Devonian, and Ordovician periods. These rocks consist of granite, gneiss, schist, and phyllite.

The survey area is believed to have been subjected to the four known major continental glaciers in North America (*6*). The most recent, the Wisconsin glacier, occurred 12,000 to 15,000 years ago during the Pleistocene epoch. This glacier is estimated to have been up to 2 miles thick at its maximum stage in this area. As the glacier moved south, it scraped the surface of the ground and picked up soil, stones, and boulders. Its crushing and scouring weight formed a compact, mixed material beneath it, called lodgement till, and left the long axes of stones oriented generally parallel to the direction of ice movement. This till generally reflects the lithology of the nearby bedrock source. In addition, as the glacier rode over the loose material overlying the bedrock, it formed drumlins, or rounded long and narrow hills consisting of firm lodgement till (*7*). Few hills in the survey area are actually drumlins; most characteristically have a rock core and are not in the true shape of the classic drumlin. The hills do, however, show a northwest-southeast grain, indicating the direction of glacial ice movement.

As the glacier melted and retreated in generally the same direction from which it came, it dumped along the receding face the load of soil, stones, and boulders it had gathered. This loose, permeable, heterogeneous material, deposited during the final downwasting of nearly static glacial ice, is called ablation till. The sandier ablation till overlies the lodgement till, except on upland slopes, and constitutes most of the land surface of the survey area. The thickness of these surficial glacial deposits in New England has been estimated at less than 10 meters and, more specifically, at 3 to 5 meters in east-central Massachusetts.

In areas of the receding glacier, the collected debris was sorted according to particle size and deposited in layers. This material is called ice-contact stratified drift. The meltwater from the receding glacier picked up some of the glacial till, sorted it according to particle size and water velocity, and redeposited it downstream from the glacier. This material is called glacial outwash. It contains layers of different thicknesses which commonly have contrasting particle sizes, ranging mainly from sand to cobblestones.

In the 12,000 to 15,000 years since the final retreat of the glacier, the streams of the counties have deposited material on their flood plains. This material is called alluvium. It tends to be coarser along the smaller, swifter streams than it is along the larger, slower streams.

The landscape of the survey area is characterized by north- to northeast-trending ridge and hill summits. Most of the summits have exposed bedrock which resisted the crushing scouring action of the glacier. The summits have the greatest local relief in the area, as much as 800 feet above nearby valley floors. Their slopes range mostly from strongly sloping to very steep. The areas of drumlins and glacial till have local relief that averages about 200 feet, and most of the slopes range from gently sloping to strongly sloping. The areas of glacial outwash generally have relief of less than 50 feet. Slopes in those areas mainly are nearly level to moderately sloping, but terrace escarpments are steeper.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material has few or no roots or other living organisms and has been changed very little by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they

drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Hinckley-Merrimac-Windsor

Very deep, nearly level to steep, excessively drained and somewhat excessively drained soils formed in sandy and gravelly outwash; on glacial outwash plains and terraces

This map unit consists of large, broad areas and narrow terraces and drainageways. Most areas are dissected by drainageways. The large, broad areas are nearly level to strongly sloping. The terrace edges and drainageways are strongly sloping to steep. Slopes range from 0 to 35 percent. The Hinckley and Windsor soils typically are on steeper slopes adjacent to the more level Merrimac soils, but all are in similar landscape positions.

This map unit makes up about 20 percent of the survey area. The unit consists of about 55 percent Hinckley soils, 10 percent Merrimac soils, 7 percent Windsor soils, and 28 percent soils of minor extent.

The Hinckley soils are nearly level to steep and excessively drained. They have a loose, sandy and gravelly subsoil and substratum.

The Merrimac soils are nearly level to moderately steep and somewhat excessively drained. They have a friable, loamy and sandy subsoil and a loose, sandy and gravelly substratum.

The Windsor soils are nearly level to moderately steep and excessively drained. They have a loose, sandy subsoil and substratum.

Of minor extent are moderately well drained Sudbury soils, poorly drained Rippowam and Walpole soils, and very poorly drained Scarboro soils. The Sudbury soils are in slightly lower landscape positions below the Hinckley, Merrimac, and Windsor soils. The Rippowam, Scarboro, and Walpole soils are in drainageways and depressions.

Most areas of this map unit are in woodland. Many areas have been developed for residential and commercial use. Some areas are used for cultivated crops, hay, and pasture.

The nearly level and gently sloping areas of this map unit are suited to cultivated crops, hay, and pasture. The main management concern is droughtiness. The hazard of erosion is a concern on sloping to steep areas. The main limitation for woodland productivity is low available water capacity. The soils are generally well suited to building site development. These soils readily absorb but do not adequately filter the effluent from septic tank absorption fields, causing a hazard of pollution to ground water.

2. Canton-Gloucester-Scituate

Very deep, nearly level to very steep, well drained, somewhat excessively drained, and moderately well drained soils formed in sandy glacial till; on uplands

This map unit consists of hills and ridges (fig. 2). Most areas have stones and boulders on the surface that are 5 to 20 feet apart. Slopes range from 0 to 45 percent. The Canton and Gloucester soils are typically

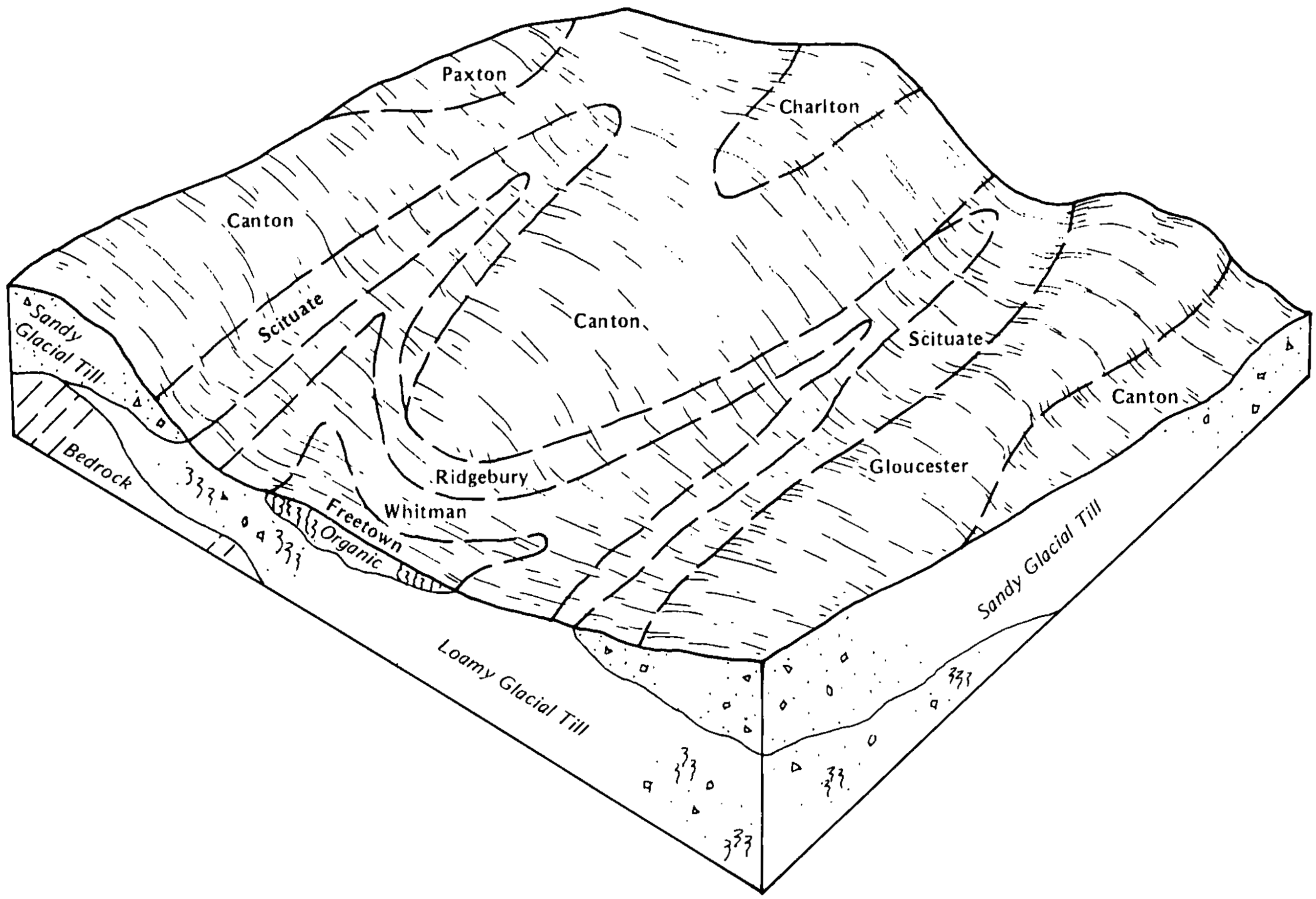

Figure 2.—Typical pattern of soils and underlying material in the Canton-Gloucester-Scituate general soil map unit.

on the sides of hills and ridges above the Scituate soils.

This map unit makes up about 30 percent of the survey area. The unit consists of about 30 percent Canton soils, 20 percent Gloucester soils, 10 percent Scituate soils, and 40 percent soils of minor extent.

The Canton soils are gently sloping to very steep and well drained. They have a friable, loamy subsoil and a very friable, sandy substratum containing some gravel.

The Gloucester soils are gently sloping to very steep and somewhat excessively drained. They have a friable to loose, sandy and gravelly subsoil and substratum.

The Scituate soils are nearly level to moderately steep and moderately well drained. They have a friable, loamy subsoil and a firm, sandy and gravelly substratum.

Of minor extent are somewhat excessively drained, shallow Hollis soils on upper slopes; well drained Charlton soils on side slopes; moderately well drained Woodbridge soils on middle to lower slopes; well drained Paxton soils on upper slopes; poorly and somewhat poorly drained Ridgebury soils on lower slopes, in depressions, and along drainageways; and very poorly drained Whitman soils in depressions and along drainageways. Also included are small areas of Freetown soils in depressions.

Most areas of this map unit are in woodland. Some areas have been developed for residential and commercial use.

The stones on the surface of this map unit make it generally poorly suited to cultivated crops, hay, and pasture. The soils have moderate to high potential for woodland productivity. Upland areas are generally well suited to building site development; however, wetness is a limitation in low areas and in depressions. The Canton and Gloucester soils readily absorb but do not adequately filter the effluent from septic tank absorption

fields, causing a hazard of pollution to ground water. The Scituate soils have restricted permeability and do not readily absorb effluent.

3. Scituate-Montauk-Charlton

Very deep, nearly level to very steep, well drained and moderately well drained soils formed in loamy and sandy glacial till; on uplands

This map unit consists of hills and ridges. Most areas have stones and boulders on the surface 5 to 20 feet apart. Slopes range from 0 to 45 percent. Typically, the Scituate soils are on lower slopes, the Montauk soils are on middle slopes, and the Charlton soils are on upper slopes.

This map unit makes up about 25 percent of the survey area. The unit consists of about 25 percent Scituate soils, 15 percent Montauk soils, 15 percent Charlton soils, and 45 percent soils of minor extent.

The Scituate soils are nearly level to moderately steep and moderately well drained. They have a friable, loamy subsoil and a firm, sandy and gravelly substratum.

The Montauk soils are gently sloping to very steep and well drained. They have a friable, loamy subsoil and a firm, sandy substratum with some gravel.

The Charlton soils are gently sloping to steep and well drained. They have a friable, loamy subsoil and substratum.

Of minor extent are somewhat excessively drained, shallow Hollis soils on upper slopes; well drained Paxton and Canton soils on upper slopes; moderately well drained Woodbridge soils on lower slopes; and poorly drained and somewhat poorly drained Ridgebury soils and very poorly drained Whitman soils along drainageways and in depressions.

Most areas of this map unit are in woodland. Some areas are used for farm and residential development.

The stones on the surface make this map unit generally poorly suited to cultivated crops, hay, and pasture. The soils have moderate potential for woodland productivity. The upland areas are generally well suited to building site development; however, wetness is a limitation in low areas and in depressions. Most of the soils have restricted permeability and do not readily absorb effluent from septic systems.

4. Paxton-Brookfield-Woodbridge

Very deep, gently sloping to steep, well drained and moderately well drained soils formed in loamy glacial till; on uplands

This map unit consists of low hills and ridges. Most areas have stones on the surface that are 5 to 20 feet apart. Slopes range from 3 to 35 percent.

This map unit makes up about 25 percent of the survey area. It consists of about 27 percent Paxton soils, 12 percent Brookfield soils, 10 percent Woodbridge soils, and 51 percent soils of minor extent.

The Paxton soils are gently sloping to moderately steep and well drained. They have a friable, loamy subsoil and a firm, loamy substratum containing some gravel.

The Brookfield soils are gently sloping to steep and well drained. They have a friable, loamy subsoil and substratum.

The Woodbridge soils are gently sloping and sloping and are moderately well drained. They have a friable, loamy subsoil and a firm, loamy substratum.

Of minor extent are somewhat excessively drained Brimfield soils and well drained Essex, Montauk, and Charlton soils on upper slopes; moderately well drained Scituate soils on lower slopes; poorly drained and somewhat poorly drained Ridgebury soils on lower slopes and along drainageways; and very poorly drained Whitman soils in depressions and along drainageways.

Most areas of this map unit are in woodland. Some areas are used for farmland or residential development.

The stones on the surface make this map unit poorly suited to cultivated crops, hay, and pasture. The soils have moderate to high potential for woodland productivity. The upland areas are generally well suited to building site development; however, wetness is a limitation in low lying areas and in depressions. Most soils have restricted permeability and do not readily absorb effluent from septic systems.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Canton fine sandy loam, 3 to 8 percent slopes, extremely stony, is one of several phases in the Canton series.

Some map units are made up of two or more major soils. These map units are called soil complexes, soil associations, or undifferentiated groups.

A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Scarboro-Rippowam complex is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Gloucester and Canton soils, steep, extremely stony, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

BoB—Brookfield fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, and slightly convex, and typically are 100 to 200 feet in length. The areas are irregular in shape and range from 25 to 100 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 2 inches thick.

The subsoil is very friable fine sandy loam about 26 inches thick. It is reddish brown in the upper 10 inches and dark brown in the lower 16 inches. The substratum is very friable, strong brown gravelly fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Charlton, Paxton, Brimfield, Woodbridge, and Ridgebury soils. The Charlton and Paxton soils are yellower and are in transitional areas. The Brimfield soils are moderately deep to bedrock. The Woodbridge and Ridgebury soils are typically in depressions. Inclusions make up about 20 percent of this map unit.

The permeability of this Brookfield soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil is suitable as a site for buildings and septic tank absorption fields. Constructing roads on well compacted, coarse-textured base material will help to protect them from damage caused by frost action.

This map unit is in capability subclass VIIs.

BoC—Brookfield fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 300 feet in length. The areas are irregular in shape and range from 25 to 100 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is very friable fine sandy loam about 26 inches thick. It is reddish brown in the upper 10 inches and dark brown in the lower 16 inches. The substratum is very friable, strong brown gravelly fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Charlton, Paxton, Brimfield, Woodbridge, and Ridgebury soils. The Charlton and Paxton soils are yellower and are in transitional areas. The Brimfield soils are moderately deep to bedrock. The Woodbridge and Ridgebury soils are typically in depressions. Inclusions make up about 20 percent of this map unit.

The permeability of this Brookfield soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Slope is the main limitation of this soil as a site for roads, buildings, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the hazard of erosion in disturbed areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Well compacted, coarse-textured base material will help protect the roads from frost damage. Land shaping and installing distribution lines across the slope are generally needed for septic tank absorption fields.

This map unit is in capability subclass VIIs.

BoD—Brookfield fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 30 to 150 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 2 inches thick.

The subsoil is very friable fine sandy loam about 26 inches thick. It is reddish brown in the upper 10 inches and dark brown in the lower 16 inches. The substratum is very friable, strong brown gravelly fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Charlton, Paxton, Brimfield, and Woodbridge soils. The Charlton and Paxton soils are yellower and are in transitional areas. The Brimfield soils are moderately deep to bedrock. The Woodbridge soils are typically in lower landscape positions. Inclusions make up about 20 percent of this map unit.

The permeability of this Brookfield soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Designing buildings and lots to conform to the natural slope of the land will help to overcome the slope and reduce the hazard of erosion in disturbed areas. Large amounts of fill generally are needed for roads on this map unit. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Land shaping and installing distribution lines across the slope are generally needed for septic tank absorption fields.

This map unit is in capability subclass VIIs.

BrC—Brookfield-Brimfield-Rock outcrop complex, strongly sloping. This map unit consists of soils and rock outcrop on hills and ridges. Slopes are complex, generally range from 3 to 15 percent, and typically are 100 to 200 feet in length. Stones on the surface are 5 to 20 feet apart, and bedrock exposures are less than 100 feet apart. The areas are irregular in shape and range from 20 to 50 acres. They are about 40 percent very deep, well drained Brookfield soils, 25 percent shallow, somewhat excessively drained Brimfield soils, 15 percent Rock outcrop, and 20 percent other soils. The areas of Brimfield and Brookfield soils and Rock outcrop are so mixed or so small that it was not practical to map them separately.

Typically, the surface layer of the Brookfield soils is very friable, very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is very friable fine sandy loam about 26 inches thick. It is reddish brown in the upper 10 inches and strong brown in the lower 16 inches. The substratum is very friable, brown gravelly fine sandy loam to a depth of 65 inches or more.

Typically, the surface layer of the Brimfield soils is very friable, very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is very friable fine sandy loam about 13 inches thick. It is reddish brown in the upper 6 inches and strong brown in the lower 7 inches. This layer is underlain by bedrock.

Included with this unit in mapping are small areas of Charlton, Paxton, Woodbridge, Hollis, and Ridgebury soils. The Charlton and Paxton soils are typically in transitional areas. The Woodbridge and Ridgebury soils are typically in lower landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are many small areas of well drained soils that are moderately deep to bedrock and soils that are undulating or rolling.

The permeability of the Brookfield and Brimfield soils is moderate or moderately rapid throughout. The available water capacity is moderate in the Brookfield soils and low in the Brimfield soils. The root zone extends into the substratum of the Brookfield soils and to bedrock in the Brimfield soils. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout these soils.

The exposed bedrock and stones on the surface make these soils poorly suited to farming. The depth to bedrock in the Brimfield soils is also a limitation in places.

Most areas of this map unit are in woodland. The potential productivity for northern red oak on these soils is moderate. The shallow depth to bedrock, the low available water capacity, and a hazard of windthrow are

major management concerns. The exposed rock limits the use of equipment. Thinning so that the change in stand density is 30 percent or less helps to prevent windthrow. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and reduce runoff and erosion. Onsite investigation in some areas will determine the special treatment needed for some types of tree plantings.

Slope and the depth to bedrock are the main limitations of the unit as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping and blasting of bedrock generally are necessary for buildings. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard, but bedrock is still a limitation in some areas. Installing distribution lines across the slope is generally needed for septic tanks, but the bedrock hinders installation in many areas.

This map unit is in capability subclass VIIs.

BrE—Brookfield-Brimfield-Rock outcrop complex, steep. This map unit consists of soils and rock outcrop on hills and ridges. Slopes range from 15 to 45 percent, are complex, and typically are 200 to 600 feet in length. Stones on the surface are 5 to 20 feet apart, and bedrock exposures are less than 100 feet apart. The areas are irregular in shape and range from 35 to 150 acres. They are about 40 percent very deep, well drained Brookfield soils, 25 percent shallow, somewhat excessively drained Brimfield soils, 15 percent Rock outcrop, and 20 percent other soils. The areas of Brimfield and Brookfield soils and Rock outcrop are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Brookfield soils is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is very friable fine sandy loam about 26 inches thick. It is reddish brown in the upper 10 inches and strong brown in the lower 16 inches. The substratum is very friable, brown gravelly fine sandy loam.

Typically, the surface layer of the Brimfield soils is very friable, very dark brown fine sandy loam about 2 inches thick. The subsoil is very friable fine sandy loam about 13 inches thick. It is reddish brown in the upper 6 inches and strong brown in the lower 7 inches. This layer is underlain by bedrock.

Included with this unit in mapping are small areas of Charlton, Paxton, and Hollis soils. The Charlton and Paxton soils typically are in transition areas. The Hollis soils are on side slopes and are shallow to bedrock. Also included are many small areas of well drained soils that are moderately deep to bedrock and small areas with slopes of as much as 80 percent.

The permeability of the Brookfield and Brimfield soils is moderate or moderately rapid throughout. The available water capacity is moderate in the Brookfield soils and low in the Brimfield soils. The root zone extends into the substratum of the Brookfield soils and to bedrock in the Brimfield soils. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout these soils.

The exposed bedrock, the slope, and the stones on the surface make these soils poorly suited to farming. The depth to bedrock in the Brimfield soils is also a limitation.

Most areas of this map unit are in woodland. The potential productivity for northern red oak on these soils is moderate. The shallow depth to bedrock, the low available water capacity, and the slope are major management concerns. Erosion is a hazard, and slope and the rock outcrop limit the use of equipment. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Thinning so that the residual stand density is at or above standard stocking levels and the change in stand density is 30 percent or less will help to prevent windthrow. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and reduce runoff and erosion. Onsite investigation in some areas will determine the special treatment needed for some types of tree plantings.

Slope and the shallow depth to bedrock are the main limitations of the unit as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping and blasting of bedrock are generally necessary. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard, but the underlying bedrock still will hinder road construction in some areas. Installing distribution lines across the slope is generally needed for septic tanks, but the bedrock hinders installation in many areas.

This map unit is in capability subclass VIIs.

CaB—Canton fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the lower sides of hills and ridges. Slopes are smooth, are slightly convex, and typically are 150 to 300 feet in length. The areas are irregular in shape and range from 25 to 100 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is friable, brown fine sandy loam about 7 inches thick. The subsoil is friable, yellowish brown and light yellowish brown fine sandy

loam about 19 inches thick. The substratum is very friable, light olive gray gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Woodbridge, Charlton, Hollis, and Ridgebury soils. The Montauk and Charlton soils are in similar landscape positions. The Woodbridge and Ridgebury soils typically are in lower landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are a few areas that have been cleared of surface stones. Inclusions make up about 20 percent of this map unit.

The permeability of this Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil has no major limitations as a site for buildings or local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of ground-water pollution.

This map unit is in capability subclass VIs.

CaC—Canton fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 400 feet in length. The areas are irregular in shape and range from 25 to 150 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is friable, brown fine sandy loam about 7 inches thick. The subsoil is friable, yellowish brown and light yellowish brown fine sandy loam about 19 inches thick. The substratum is very friable, light olive gray gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Woodbridge, Charlton, Hollis, and Ridgebury soils. The Montauk and Charlton soils are in similar landscape positions. The Woodbridge and Ridgebury soils typically are in lower landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are a few areas that have been cleared of surface stones. Inclusions make up about 20 percent of this map unit.

The permeability of this Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering capacity of the soil causes a hazard of ground-water pollution.

This map unit is in capability subclass VIs.

CcB—Canton fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of

hills and ridges. Slopes are smooth, are slightly convex, and typically are 150 to 500 feet in length. The areas are irregular in shape and range from 25 to 150 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is friable, brown fine sandy loam about 7 inches thick. The subsoil is friable, yellowish brown and light yellowish brown fine sandy loam about 19 inches thick. The substratum is very friable, light olive gray gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Woodbridge, Charlton, Hollis, and Ridgebury soils. The Montauk and Charlton soils are in similar landscape positions. The Woodbridge and Ridgebury soils typically are in lower landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are a few areas that have been cleared of surface stones. Inclusions make up about 20 percent of this map unit.

The permeability of this Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil has no major limitations as a site for buildings or local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of ground-water pollution.

This map unit is in capability subclass VIIs.

CcC—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly convex, and typically are 150 to 500 feet in length. The areas are irregular in shape and range from 25 to 150 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is friable, brown fine sandy loam about 7 inches thick. The subsoil is friable, yellowish brown and light yellowish brown fine sandy loam about 19 inches thick. The substratum, to a depth of 65 inches, is very friable, light olive gray gravelly loamy sand.

Included with this soil in mapping are small areas of Montauk, Woodbridge, Charlton, Hollis, and Ridgebury soils. The Montauk and Charlton soils are in similar landscape positions. The Woodbridge and Ridgebury soils typically are in lower landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are a few areas that have been cleared of surface stones. Inclusions make up about 20 percent of this map unit.

The permeability of this Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering

capacity of the soil causes a hazard of ground-water pollution.

This map unit is in capability subclass VIIs.

CcD—Canton fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 150 to 500 feet in length. The areas are irregular in shape and range from 30 to 200 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is friable, brown fine sandy loam about 5 inches thick. The subsoil is friable, yellowish brown and light yellowish brown fine sandy loam about 19 inches thick. The substratum is very friable, light olive gray gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Woodbridge, Charlton, and Hollis soils. The Montauk and Charlton soils are in similar landscape positions. The Woodbridge soils are in lower positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are a few areas that have been cleared of surface stones. Inclusions make up about 20 percent of this map unit.

The permeability of this Canton soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. Slope causes a hazard of erosion and limits the use of equipment. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering capacity of the soil causes a hazard of ground-water pollution.

This map unit is in capability subclass VIIs.

CmB—Charlton fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 100 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 23 inches thick. It is yellowish brown in the upper part and light olive brown in the lower part. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Paxton, Woodbridge, Ridgebury, and Brookfield soils. The Paxton soils have a firm substratum and contain less sand. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield soils are redder and are in transitional areas. Inclusions make up about 20 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of

regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil is suitable as a site for buildings, local roads, and septic tank absorption fields.

This map unit is in capability subclass VIs.

CnB—Charlton fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 500 feet in length. Areas are irregular in shape and range from 25 to 150 acres in size. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 23 inches thick. It is brown in the upper 7 inches, yellowish brown in the next 5 inches, and light olive brown in the lower 11 inches. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Paxton, Woodbridge, Ridgebury, and Brookfield soils. The Paxton soils have a firm substratum and contain less sand. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield soils are redder and are in transitional areas. Inclusions make up about 20 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil is suitable as a site for buildings, local roads, and septic tank absorption fields.

This map unit is in capability subclass VIIs.

CnC—Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the lower sides of hills and ridges. Slopes are smooth, are slightly convex, and typically are 150 to 600 feet in length. The areas are irregular in shape and range from 30 to 150 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 20 inches thick. It is brown in the upper 4 inches, yellowish brown in the next 5 inches, and light olive brown in the lower 11 inches. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Paxton, Woodbridge, Ridgebury, and Brookfield soils. The Paxton soils have a firm substratum and contain less sand. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield soils are redder and are in transitional areas. Inclusions make up about 20 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Slope is the main limitation of this soil as a site for roads, buildings, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the hazard of erosion in disturbed areas. Constructing

roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Well compacted, coarse-textured base material will help protect the roads from frost damage. Land shaping and installing distribution lines across the slope are generally needed for septic tank absorption fields.

This map unit is in capability subclass VIIs.

CnD—Charlton fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 150 to 600 feet in length. The areas are irregular in shape and range from 30 to 250 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown fine sandy loam about 1 inch thick. The subsoil is friable fine sandy loam about 18 inches thick. It is brown in the upper 3 inches, yellowish brown in the next 4 inches, and light olive brown in the lower 11 inches. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Paxton, Woodbridge, and Brookfield soils. The Paxton soils have dense underlying material. The Woodbridge soils are in lower positions. The Brookfield soils are redder and are in transitional areas. Inclusions make up about 15 percent of this map unit.

The permeability of this Charlton soil is moderate or moderately rapid. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from very strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. The slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Designing buildings and lots to conform to the natural slope of the land will help to overcome the slope and reduce the hazard of erosion in disturbed areas. Large amounts of fill generally are needed for roads on this map unit. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Land shaping and installing distribution lines across the slope are generally needed for septic tank absorption fields.

This map unit is in capability subclass VIIs.

CrC—Charlton-Hollis-Rock outcrop complex, strongly sloping. This map unit consists of soils and rock outcrop on hills and ridges. Slopes are complex and typically are 100 to 600 feet in length. They generally range from 8 to 15 percent. Stones on the surface are 5 to 20 feet apart, and bedrock exposures are less than 100 feet apart. The areas are irregular in shape and range from 25 to 80 acres. They are about 45 percent very deep, well drained Charlton soils, 10 percent shallow, somewhat excessively drained Hollis soils, 10 percent Rock outcrop, and 35 percent other soils. The areas of Charlton and Hollis soils and Rock outcrop are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Charlton soils is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is friable fine sandy loam about 23 inches thick. It is brown in the upper 7 inches, yellowish brown in the next 5 inches, and light olive brown in the lower 11 inches. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Typically the surface layer of the Hollis soils is very friable, dark brown fine sandy loam about 2 inches thick. The subsoil is very friable, strong brown fine sandy loam about 14 inches thick. This is underlain by bedrock.

Included with this unit in mapping are small areas of Paxton, Woodbridge, Ridgebury, Brookfield, and Brimfield soils. The Paxton soils have dense underlying material and are on hills and knolls. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are many small areas of well drained soils with bedrock at a depth of 40 to 65

inches and a few areas of undulating or rolling soils.

The permeability is moderate or moderately rapid throughout these Charlton and Hollis soils. The available water capacity is moderate in the Charlton soils and low in the Hollis soils. The root zone extends into the substratum of the Charlton soils and to bedrock in the Hollis soils. Reaction in unlimed areas is very strongly acid or strongly acid in both soils.

The exposed bedrock and stones on the surface make these soils poorly suited to farming. The shallow depth to bedrock in the Hollis soil is a limitation in places.

The potential productivity for northern red oak on these soils is low. The shallow depth to bedrock, the low available water capacity, and a hazard of windthrow are major management concerns. The exposed rock limits the use of equipment. Thinning so that the change in stand density is 30 percent or less helps to prevent windthrow. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and reduce runoff and erosion. Onsite investigation in some areas will determine the special treatment needed for some types of tree plantings.

Slope and the depth to bedrock are the main limitations of the unit as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping and blasting of bedrock generally are necessary for buildings. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard, but bedrock is still a limitation in some areas. Installing distribution lines across the slope is generally needed for septic tanks, but the bedrock hinders installation in many areas.

This map unit is in capability subclass VIIs.

CrE—Charlton-Hollis-Rock outcrop complex, steep. This map unit consists of soils and rock outcrop on hills and ridges (fig. 3). Slopes are complex and typically are 80 to 500 feet in length. Slopes generally range from 15 to 45 percent. Stones on the surface are 5 to 20 feet apart, and bedrock exposures are less than 100 feet apart. The areas are irregular in shape and range from 40 to 300 acres. They are about 45 percent very deep, well drained Charlton soils, 10 percent shallow, somewhat excessively drained Hollis soils, 10 percent Rock outcrop, and 35 percent other soils. The Charlton and Hollis soils and Rock outcrop are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Charlton soils is very friable, dark brown fine sandy loam about 1 inch thick. The subsoil is friable fine sandy loam about 18 inches thick. It is brown in the upper 3 inches, yellowish brown in the next 4 inches, and light olive brown in the lower 11 inches. The substratum is friable to firm, dark grayish brown fine sandy loam to a depth of 65 inches or more.

Typically, the surface layer of the Hollis soils is very friable, brown to dark brown fine sandy loam about 2 inches thick. The subsoil is very friable, strong brown fine sandy loam about 14 inches thick. This is underlain by bedrock.

Included with this complex in mapping are small areas of Paxton, Brookfield, and Brimfield soils. The Paxton soils have dense underlying material and are on hills and knolls. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are many small areas of well drained soils with bedrock at a depth of 40 to 65 inches and small areas with slopes of as much as 80 percent.

The permeability is moderate or moderately rapid throughout these Charlton and Hollis soils. The available water capacity is moderate in the Charlton soils and low in the Hollis soils. The root zone extends into the substratum of the Charlton soils and to bedrock in the Hollis soils. Reaction in unlimed areas is very strongly acid or strongly acid in both soils.

The exposed bedrock, the slope, and the stones on the surface make these soils poorly suited to farming. The shallow depth to bedrock in the Hollis soils is a limitation in places.

The potential productivity for northern red oak on these soils is low. The shallow depth to bedrock, the low available water capacity, and the slope are major management concerns. Erosion is a hazard, and slope and the rock outcrop limit the use of equipment. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Thinning so that the residual stand density is at or above standard stocking levels and the change in stand density is 30 percent or less will help to prevent windthrow. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and reduce runoff and erosion. Onsite investigation in some areas will determine the special treatment needed for some types of tree plantings.

Slope and the shallow depth to bedrock are the main limitations of the unit as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping and blasting of bedrock are generally necessary. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard, but the underlying bedrock still will hinder road construction in some areas. Installing distribution lines

Figure 3.—Rock outcrop in an area of Charlton-Hollis-Rock outcrop complex, steep.

across the slope is generally needed for septic tanks, but the bedrock hinders installation in many areas.

This map unit is in capability subclass VIIs.

De—Deerfield loamy fine sand. This soil is very deep, nearly level, and moderately well drained. It is on broad areas. Slopes are smooth, are plane, and typically are 50 to 300 feet in length. The areas are irregular in shape and range from 30 to 50 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very friable, dark reddish brown loamy fine sand about 6 inches thick. The subsoil is very friable and about 17 inches thick. It is dark brown loamy fine sand in the upper 10 inches and strong brown loamy sand in the lower 7 inches. The substratum is stratified sand and gravel to a depth of 65 inches or more. It is mottled in the upper part.

Included with this soil in mapping are small areas of Hinckley, Windsor, Sudbury, and Walpole soils. The Sudbury and Walpole soils mainly are at lower positions, and the Hinckley and Windsor soils mainly are at higher positions. Also included are areas with slopes of less than 3 percent. Included soils make up about 20 percent of the map unit.

The permeability of this Deerfield soil is rapid in the subsoil and rapid or very rapid in the substratum. The available water capacity is low. The root zone extends into the substratum. This soil has a seasonal high water table in winter and spring. Reaction in unlimed areas ranges from very strongly acid to slightly acid throughout the soil.

Most areas of this map unit are in woodland. Some

areas are cultivated, and some are used as homesites.

This soil is suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. The seasonal high water table is a main limitation, but the soil is droughty in summer. The main farming management practices on this soil are applying fertilizer, adding organic matter to the surface layer, and using cover crops. Subsurface drains are needed in wet spots.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against wetness. Raised, coarse-textured base material and adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. Poor filtering capacity is an additional limitation of the soil as a site for septic tank absorption fields. It causes a hazard of pollution to ground water. Placing distribution lines in a mound of more suitable fill material will help to overcome the wetness and the poor filtering.

This map unit is in capability class IIIw.

Du—Dumps, landfill. This map unit consists of areas used for residential and commercial trash disposal. Most are in or near developed areas throughout the survey area and are adjacent to poorly drained and very poorly drained soils. Most areas range from 10 to 40 acres.

Dumps are commonly called landfills or sanitary landfills and consist mostly of paper, metal, plastic, glass, rubble, cinders, and organic debris. A few dumps contain tree stumps, old automobile bodies, concrete, and debris from razed buildings. The characteristics of each area vary according to the kinds of refuse, the manner in which it has been deposited and packed, and whether the areas have been leveled, covered, or graded. All areas are subject to some degree of subsidence.

Included with this unit in mapping are small areas of Hinckley, Windsor, and Deerfield soils and other soils which have stratified material in the substratum.

Onsite investigation and evaluation of these areas is required to determine the suitability of the unit for any use.

This map unit is not assigned to a capability subclass.

EeB—Essex gravelly fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is at the top and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 400 feet in length. The areas are rectangular to oval and range from 25 to 60 acres.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, Woodbridge, and Ridgebury soils. The Gloucester soils contain more rock fragments and are on similar landscape positions. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Scituate, Woodbridge, and Ridgebury soils are in lower landscape positions. Also included are small, nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. The very low available water capacity is a major management concern. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping

system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation helps increase the seedling survival rate of preferred trees.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings with tile lines around the basement will help to avoid damage caused by the water table. Well compacted, coarse-textured base material and adequate side ditches and culverts will help protect the roads from damage caused by soil wetness. The permeability of this soil is an additional limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass IIe.

EsB—Essex gravelly fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is at the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 60 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, Woodbridge, and Ridgebury soils. The Gloucester soils contain more rock fragments and are in similar landscape positions. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Scituate, Woodbridge, and Ridgebury soils are in lower landscape positions. Also included are small, nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation helps increase the seedling survival rate of preferred trees.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings with tile lines around the basement will help to avoid damage caused by the water table. Well compacted, coarse-textured base material and adequate side ditches and culverts will help to protect the roads from damage caused by soil wetness. The permeability of this soil is an additional limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIs.

EsC—Essex gravelly fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is at the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 600 feet in length. The areas are irregular in shape and range from 25 to 50 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish

brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, Woodbridge, and Ridgebury soils. Gloucester soils contain more rock fragments and are in similar landscape positions. The Montauk and Charlton soils are fine textured and are on hills and knolls. The Scituate, Woodbridge, and Ridgebury soils are at lower landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation helps increase the seedling survival rate of preferred trees.

Constructing buildings with tile lines around the basement will help to avoid damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Land shaping is necessary in some areas. Designing lots so that surface water drains away from buildings will provide added protection against damage caused by soil wetness. Slope is the main limitation for road construction. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The permeability of this soil is the main limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIs.

ExB—Essex gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is at the tops and upper sides of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 75 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, Woodbridge, and Ridgebury soils. The Gloucester soils contain more rock fragments and are in similar landscape positions. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Scituate, Woodbridge, and Ridgebury soils are in lower landscape positions. Also included are small, nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation helps increase the seedling survival rate of preferred trees.

Constructing buildings with tile lines around the basement will help to avoid damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Land shaping is necessary in some areas. Designing lots so that surface

water drains away from buildings will provide added protection against damage caused by soil wetness. Slope is the main limitation for road construction. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The permeability of this soil is the main limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIIs.

ExC—Essex gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is at the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 600 feet in length. The areas are irregular in shape and range from 25 to 75 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, and Woodbridge soils. The Gloucester soils contain more rock fragments and are on similar landscape positions. The Montauk and Charlton soils are on fine textured hills and knolls. The Scituate and Woodbridge soils are in lower landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation helps increase the seedling survival rate of preferred trees.

Constructing buildings with tile lines around the basement will help to avoid damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Land shaping is necessary in some areas. Designing lots so that surface water drains away from buildings will provide added protection against damage caused by soil wetness. Slope is the main limitation for road construction. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The permeability of this soil is the main limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIIs.

ExD—Essex gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 200 to 1,000 feet in length. The areas are irregular in shape and range from 40 to 200 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark yellowish brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and about 26 inches thick. It is dark brown gravelly sandy loam in the upper 12 inches, dark yellowish brown gravelly loamy sand in the next 11 inches, and pale brown gravelly loamy sand in the lower 3 inches. The substratum is firm, grayish brown gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Gloucester, Montauk, Charlton, Scituate, and Woodbridge soils. The Gloucester soils contain more rock fragments and are on similar landscape positions. The Montauk and Charlton soils are on finer textured hills and knolls. The Scituate and Woodbridge soils are in lower landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Essex soil is moderately rapid or rapid in the subsoil and moderately slow in the substratum. The available water capacity is very low. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid

to moderately acid throughout the soil.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for red pine on this soil is high. The limited available water capacity of the soil causes moderate seedling mortality. Slope causes a hazard of erosion and limits the use of equipment. Thinning dead or diseased trees or other trees in crowded areas will enhance growth and regeneration. The removal or control of competing understory vegetation helps the growth of new plantings. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is the main limitation on the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The restricted permeability is an additional limitation of the soil as a site for septic tank absorption fields; the soil does not readily absorb effluent.

This map unit is in capability subclass VIIs.

Fm—Freetown muck. This soil is very deep, nearly level, and very poorly drained. It is in depressions and on plane areas. Slopes are smooth and slightly concave. The areas are circular or irregular in shape and range from 10 to 50 acres.

Typically, this soil consists of black to dark brown decomposed organic material to a depth of 51 inches or more.

Included with this soil in mapping are a few small areas of Whitman, Scarboro, Ridgebury, Walpole, and Swansea soils. The Whitman, Scarboro, Ridgebury, and Walpole soils formed in mineral material and are at the fringes of this map unit. The Swansea soils are shallower to mineral material and are in similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Freetown soil is moderate or moderately rapid. The available water capacity is high. The root zone is restricted by a high water table that is at or near the surface throughout the year. Reaction in unlimed areas is extremely acid throughout the soil.

This soil is poorly suited to cultivated crops, hay, and pasture because of the high water table. This soil is difficult to drain because of the lack of suitable outlets. The plant cover is easily cut and dislodged by the hoofs of animals.

The potential productivity for red maple on this soil is moderate. The high water table, high seedling mortality, and a hazard of windthrow are the main management concerns. Low strength limits the operation of equipment to periods when the soil is dry or frozen. Thinning so that residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less helps to reduce windthrow. Onsite investigation is needed to determine if tree plantings are practical with special treatment.

The water table and low strength are the main limitations of the soil as a site for buildings, roads, and septic tank absorption fields. This soil is generally unsuitable as a site for buildings or septic tank absorption fields. Raised, coarse-textured fill material and adequate side ditches and culverts help protect roads from damage caused by ponding and low soil strength.

This map unit is in capability subclass Vw.

GfB—Gloucester gravelly fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat excessively drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are rectangular and range from 20 to 40 acres.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 7 inches thick. The subsoil is very friable and yellowish brown and is about 22 inches thick. It is gravelly sandy loam in the upper 8 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Essex, Charlton, Woodbridge, Scituate, and Ridgebury soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Essex soils contain fewer rock fragments and are on similar landscape positions. The Woodbridge, Scituate, and Ridgebury soils are in lower landscape positions. Also included are a few nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone

extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this soil are in woodland. Some areas are farmed, and some are used as homesites.

The soil is suited to cultivated crops, hay, and pasture. Providing irrigation is a major management concern. Good tilth is easily maintained in cultivated areas. Conservation tillage, using cover crops and grasses and legumes in the cropping system, and mixing crop residue and manure into the surface layer help maintain tilth and increase the organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. The limited available water capacity of the soil causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the rate of seedling survival of preferred trees.

This soil is suitable as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, and thus pollution of ground water is a hazard.

This map unit is in capability subclass IIs.

GhB—Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and somewhat excessively drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 40 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 5 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 10 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Essex, Charlton, Woodbridge, Scituate, and Ridgebury soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Essex soils contain fewer rock fragments and are on similar landscape positions. The Woodbridge, Scituate, and Ridgebury soils are in lower landscape positions. Also included are a few nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. The limited available water capacity of the soil causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the rate of seedling survival of preferred trees.

The stones on the surface hinder some types of operations for constructing buildings and roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, and thus pollution of ground water is a hazard.

This map unit is in capability subclass VIs.

GhC—Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and somewhat excessively drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 800 feet in length. The areas are irregular in shape and range from 25 to 50 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 5 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 10 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Essex, Charlton, Woodbridge, Scituate, and Ridgebury soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Essex soils contain fewer rock fragments and are on similar landscape positions. The Woodbridge, Scituate, and Ridgebury soils are in lower landscape positions. Also

included are a few nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Providing irrigation is a major concern. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable plant species.

Potential productivity for northern red oak on this soil is moderate. The limited available water capacity of the soil causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the rate of seedling survival of preferred trees.

Slope is a main limitation of this soil as a site for buildings, roads, and septic tank absorption fields, and the stones on the surface hinder some types of construction. Buildings designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, and thus pollution of ground water is a hazard.

This map unit is in capability subclass VIs.

GxB—Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and somewhat excessively drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 50 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 5 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 10 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Essex, Charlton, Woodbridge, Scituate, and Ridgebury soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Essex soils contain fewer rock fragments and are on similar landscape positions. The Woodbridge, Scituate, and Ridgebury soils are in lower landscape positions. Also included are a few nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. The limited available water capacity of the soil causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the rate of seedling survival of preferred trees.

The stones on the surface hinder some types of operations for constructing buildings and roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, and thus pollution of ground water is a hazard.

This map unit is in capability subclass VIIs.

GxC—Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and somewhat excessively drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 25 to 50 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 5 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 10 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of

Montauk, Essex, Charlton, Woodbridge, Scituate, and Ridgebury soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Essex soils contain fewer rock fragments and are on similar landscape positions. The Woodbridge, Scituate, and Ridgebury soils are in lower landscape positions. Also included are a few nearly level areas. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. The limited available water capacity of the soil causes moderate seedling mortality. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb the precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the rate of seedling survival of preferred trees.

Slope is a main limitation of this soil as a site for buildings, roads, and septic tank absorption fields, and the stones on the surface hinder some types of construction. Buildings designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, and thus pollution of ground water is a hazard.

This map unit is in capability subclass VIIs.

GxD—Gloucester gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and somewhat excessively drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 800 feet in length. The areas are irregular in shape and range from 25 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, dark brown gravelly fine sandy loam about 4 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 11 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Montauk, Essex, Charlton, Woodbridge, and Scituate soils. The Montauk and Charlton soils are finer textured and are on hills and knolls. The Woodbridge and Scituate soils are in lower landscape positions. The Essex soils contain fewer rock fragments and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on these soils is moderate. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Slope causes a hazard of erosion and limits the operation of equipment. Thinning undesirable stock such as dead or diseased trees or removing trees in crowded areas will enhance growth and regeneration. The removal or control of competing understory vegetation allows optimum growth in new plantings. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is a main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome

the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIIs.

GyE—Gloucester and Canton soils, steep, extremely stony. This unit consists of very deep, steep soils on the sides of hills and ridges. Slopes are generally smooth, are convex, typically are 200 to 1,000 feet in length, and range from 25 to 45 percent. Stones on the surface mainly are 5 to 20 feet apart. The areas are irregular in shape and range from 50 to 300 acres. Some consist of somewhat excessively drained Gloucester soils, some of well drained Canton soils, and some of both. The soils were mapped together because there are no major differences in their use and management. The total acreage of this map unit is about 40 percent Gloucester soils, 40 percent Canton soils, and 20 percent other soils.

Typically, the Gloucester soils have a surface layer of very friable, dark brown gravelly fine sandy loam about 3 inches thick. The subsoil is very friable and yellowish brown and is about 24 inches thick. It is gravelly sandy loam in the upper 10 inches and very gravelly loamy sand in the lower 14 inches. The substratum is loose, light brownish gray very gravelly loamy sand to a depth of 65 inches or more.

Typically, the Canton soils have a surface layer of friable, dark brown fine sandy loam about 4 inches thick. The subsoil is friable, yellowish brown fine sandy loam about 20 inches thick. The substratum is very friable, light olive gray gravelly loamy sand to a depth of 65 inches or more.

Included with these soils in mapping are small areas of Montauk, Essex, and Hollis soils. The Montauk and Essex soils are on similar landscape positions. The Hollis soils are on side slopes and are shallow to bedrock. Also included are areas of Scituate and Ridgebury soils in depressions and lower side slopes.

The permeability of the Gloucester soil is rapid, and the available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid.

The permeability of the Canton soil is moderately rapid in the upper part and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this unit are wooded. Slope and the stones on the surface make this map unit poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on these soils is moderate. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Slope causes a hazard of erosion and limits the operation of equipment. Thinning undesirable stock such as dead or diseased trees or removing trees in crowded areas will enhance growth and regeneration. The removal or control of competing understory vegetation allows optimum growth in new plantings. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is a main limitation of the soils as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIIs.

HgA—Hinckley loamy sand, 0 to 3 percent slopes. This soil is very deep, nearly level, and excessively drained. It is in large, broad areas. Slopes are smooth and plane. The areas are irregular in shape and range from 20 to 100 acres.

Typically, the surface layer is very friable, very dark grayish brown loamy sand about 3 inches thick. The subsoil is loose, yellowish brown loamy sand about 12 inches thick. The substratum is loose, light yellowish brown stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Windsor, Merrimac, Deerfield, and Sudbury soils. The Windsor and Merrimac soils are in similar landscape positions. The Deerfield and Sudbury soils are in lower landscape positions. Also included are a few small areas with a surface layer of silt loam. Included soils

make up about 20 percent of the map unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. The available water capacity is very low. The root zone extends into the substratum, but root growth is restricted by the loose, stratified sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are used as homesites.

This soil is suited to cultivated crops, hay, and pasture. The erosion hazard is slight, but the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, and additions of organic matter to the surface layer.

The potential productivity for eastern white pine on this soil is high. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing soil disturbance to retain the spongelike mulch of leaves that absorb precipitation and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture.

This soil has no major limitations as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of pollution to ground water.

This map unit is in capability subclass IIIs.

HgB—Hinckley loamy sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are slightly convex, and typically are 75 to 200 feet in length. The areas are irregular in shape and range from 25 to 100 acres.

Typically, the surface layer is very friable, very dark grayish brown loamy sand about 3 inches thick. The subsoil is loose, yellowish brown loamy sand about 12 inches thick. The substratum is loose, light yellowish brown stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Windsor, Merrimac, Deerfield, and Sudbury soils. The Windsor and Merrimac soils are in similar landscape positions. The Deerfield and Sudbury soils are in lower landscape positions. Also included are a few small areas with a surface layer of silt loam. Included soils make up about 20 percent of the map unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. The available water capacity is very low. The root zone extends into the substratum, but root growth is restricted by the loose, stratified sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are used as homesites.

This soil is suited to cultivated crops, hay, and pasture. The erosion hazard is slight, but the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, and cover crops.

The potential productivity for eastern white pine on this soil is high. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing soil disturbance to retain the spongelike mulch of leaves that absorb precipitation and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture.

This soil has no major limitations as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of pollution to ground water.

This map unit is in capability subclass IIIs.

HgC—Hinckley loamy sand, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are convex, and typically are 50 to 300 feet in length. The areas are irregular in shape and range from 25 to 100 acres.

Typically, the surface layer is very friable, very dark grayish brown loamy sand about 3 inches thick. The subsoil is loose, yellowish brown loamy sand about 12 inches thick. The substratum is loose, light yellowish brown stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are small areas of

Windsor, Merrimac, Deerfield, and Sudbury soils. The Windsor and Merrimac soils are in similar landscape positions. The Deerfield and Sudbury soils are in lower landscape positions. Also included are a few small areas with a surface layer of silt loam. Included soils make up about 20 percent of the map unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. The available water capacity is very low. The root zone extends into the substratum, but root growth is restricted by the loose, stratified sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. Some areas are used as homesites.

This soil is poorly suited to cultivated crops, hay, and pasture. The erosion hazard is moderate, and the soil is droughty. The main management needs are irrigation, frequent applications of fertilizer, erosion control, and cover crops.

The potential productivity for eastern white pine on this soil is high. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing soil disturbance to retain the spongelike mulch of leaves that absorb precipitation and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering capacity of the soil causes a hazard of ground-water pollution.

This map unit is in capability subclass IVs.

HgD—Hinckley loamy sand, 15 to 25 percent slopes. This soil is very deep, moderately steep, and excessively drained. It is in long, narrow areas. Slopes are simple to complex, are convex, and typically are 50 to 200 feet in length. The areas are irregular in shape and range from 30 to 80 acres.

Typically, the surface layer is very friable, very dark grayish brown loamy sand about 3 inches thick. The subsoil is loose, yellowish brown loamy sand about 12 inches thick. The substratum is loose, light yellowish brown stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Windsor, Merrimac, Deerfield, and Sudbury soils. The Windsor and Merrimac soils are in similar landscape positions. The Deerfield and Sudbury soils are in lower landscape positions. Also included are a few small areas with a surface layer of silt loam. Included soils make up about 20 percent of the map unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. The available water capacity is very low. The root zone extends into the substratum, but root growth is restricted by the loose, stratified sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in woodland. A few areas are used as homesites.

This soil is poorly suited to cultivated crops, hay, and pasture. The soil is droughty, and slope limits the use of equipment. The erosion hazard is moderate.

The potential productivity for eastern white pine on this soil is high. Droughtiness and the hazard of erosion are management concerns. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing disturbance to retain the spongelike mulch of leaves and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is a main limitation of the soils as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting

grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIs.

HgE—Hinckley loamy sand, 25 to 35 percent slopes. This soil is very deep, steep, and excessively drained. It is in long, narrow areas. Slopes are simple to complex, are convex, and typically are 50 to 200 feet in length. The areas are irregular in shape and range from 30 to 70 acres.

Typically, the surface layer is very friable, very dark grayish brown loamy sand about 3 inches thick. The subsoil is loose, yellowish brown loamy sand about 12 inches thick. The substratum is loose, light yellowish brown stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Windsor and Merrimac soils on similar landscape positions. Also included are a few small areas with a surface layer of silt loam. Included soils make up about 20 percent of the map unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. The available water capacity is very low. The root zone extends into the substratum, but root growth is restricted by the loose, stratified sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

This soil is poorly suited to cultivated crops, hay, and pasture. The soil is droughty, and slope limits the use of equipment. The erosion hazard is severe.

The potential productivity for eastern white pine on this soil is high. Droughtiness and the hazard of erosion are management concerns. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing disturbance to retain the spongelike mulch of leaves and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is a main limitation of the soils as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIIs.

MeA—Merrimac sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat excessively drained. It is in large, broad areas. Slopes are smooth and typically are 100 to 600 feet in length. The areas are irregular in shape and range from 30 to 100 acres.

Typically, the surface layer is very friable, very dark grayish brown sandy loam about 5 inches thick. The subsoil is very friable and about 24 inches thick. It is brown sandy loam in the upper 13 inches, light yellowish brown sandy loam in the next 8 inches, and light gray gravelly loamy sand in the lower 3 inches. The substratum is loose, multicolored, stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are Windsor, Hinckley, Sudbury, and Walpole soils. The Windsor and Hinckley soils are in higher landscape positions. The Sudbury and Walpole soils are in lower positions. Included soils make up about 20 percent of the map unit.

The permeability of this Merrimac soil is moderately rapid or rapid in the subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum, but root growth is restricted by the loose sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to medium acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and many are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Droughtiness is the main limitation. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. Conservation tillage and cover crops and grasses and legumes in the cropping system help to improve tilth and increase the organic matter content

of the surface layer. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. The removal and control of competing understory vegetation increases the seedling survival rate of preferred trees.

This soil has no major limitations as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of pollution to ground water.

This map unit is in capability subclass IIs.

MeB—Merrimac sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are slightly convex, and typically are 50 to 200 feet in length. The areas are irregular in shape and range from 30 to 150 acres.

Typically, the surface layer is very friable, very dark grayish brown sandy loam about 5 inches thick. The subsoil is very friable and about 24 inches thick. It is brown sandy loam in the upper 13 inches, light yellowish brown sandy loam in the next 8 inches, and light gray gravelly loamy sand in the lower 3 inches. The substratum is loose, multicolored, stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are Windsor, Hinckley, Sudbury, and Walpole soils. The Windsor and Hinckley soils are in higher landscape positions. The Sudbury and Walpole soils are in lower positions. Included soils make up about 20 percent of the map unit.

The permeability of this Merrimac soil is moderately rapid or rapid in the subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum, but root growth is restricted by the loose sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to medium acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and many are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Droughtiness is the main limitation. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to control erosion, improve tilth, and increase the organic matter content of the surface layer. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the seedling survival rate of preferred trees.

This soil has no major limitations as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of pollution to ground water.

This map unit is in capability subclass IIs.

MeC—Merrimac sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are convex, and typically are 50 to 200 feet in length. The areas are irregular in shape and range from 30 to 80 acres.

Typically, the surface layer is very friable, very dark grayish brown sandy loam about 5 inches thick. The subsoil is very friable and about 24 inches thick. It is brown sandy loam in the upper 13 inches, light yellowish brown sandy loam in the next 8 inches, and light gray gravelly loamy sand in the lower 3 inches. The substratum is loose, multicolored, stratified sand and gravel to a depth of 65 inches or more.

Included with this soil in mapping are Windsor, Hinckley, Sudbury, and Walpole soils. The Windsor and Hinckley soils are in higher landscape positions. The Sudbury and Walpole soils are in lower positions. Included soils make up about 20 percent of the map unit.

The permeability of this Merrimac soil is moderately rapid or rapid in the subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum, but root growth is restricted by the loose sand and gravel in the substratum. Reaction in unlimed areas ranges from extremely acid to medium acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and many are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. A moderate hazard of erosion and

droughtiness are the main limitations. Good tilth is easily maintained in cultivated areas. Conservation tillage, contour tillage, stripcropping, and terracing help to control erosion. Cover crops and grasses and legumes in the cropping system help to control erosion, improve tilth, and increase the organic matter content of the soil. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Keeping soil disturbance to a minimum will help to retain the spongelike mulch of leaves that absorb precipitation and retain the limited soil moisture. The removal or control of competing understory vegetation increases the seedling survival rate of preferred trees.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering capacity of the soil causes a hazard of ground water pollution.

This map unit is in capability subclass IIIe.

MoB—Montauk fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 400 feet in length. The areas are rectangular and range from 20 to 40 acres.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 8 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Essex soils are sandier. The Paxton soils contain less sand in the substratum and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass IIe.

MsB—Montauk fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly

convex, and typically are 100 to 600 feet in length. The areas are irregular in shape and range from 20 to 40 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 8 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Essex soils are sandier. The Paxton soils contain less sand in the substratum and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIs.

MsC—Montauk fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 900 feet in length. The areas are irregular in shape and range from 20 to 50 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 6 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 7 inches. The substratum is very gray, firm gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Paxton soils contain less sand in the substratum and are on similar landscape positions. The Essex soils are sandier. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the firm substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of

regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIs.

MsD—Montauk fine sandy loam, 15 to 25 percent slopes, very stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 30 to 80 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is friable and about 17 inches thick. It is strong brown fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 7 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Paxton soils contain less sand in the substratum and are on similar landscape positions. The Essex soils are sandier. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is a main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Designing buildings and lots to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The seasonal high water table and the restricted permeability are additional main limitations for septic tank absorption fields.

This map unit is in capability subclass VIs.

MxB—Montauk fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 400 feet in length. The areas are irregular in shape and range from 30 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 8

inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Essex soils are sandier. The Paxton soils contain less sand in the substratum and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Tile drains around foundations of buildings will help to remove excess subsurface water. Landscaping designed to drain surface water away from the buildings will provide added protection against damage caused by soil wetness. In places, the large stones on the soil hinder excavation and road construction. The seasonal high water table and the restricted permeability of this soil are the main limitations for septic tank absorption fields. A larger-than-average drain field will help to overcome these limitations.

This map unit is in capability subclass VIIs.

MxC—Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 600 feet in length. The areas are irregular in shape and range from 30 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 10 inches and light olive brown sandy loam in the lower 8 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Essex soils are sandier. The Paxton soils contain less sand in the substratum and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Designing buildings to conform to the natural slope of the land will help to overcome the slope limitation and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. The large stones on this soil hinder excavation and road construction. Constructing roads on the contour and planting grasses

on roadbanks will help to reduce the erosion hazard. The water table and the restricted permeability are the main limitations of the soil as a site for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

MxD—Montauk fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 100 to 1,000 feet in length. The areas are irregular in shape and range from 30 to 200 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 11 inches and light olive brown gravelly sandy loam in the lower 7 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with this soil in mapping are Essex, Canton, Scituate, Woodbridge, Gloucester, Paxton, and Charlton soils. The Scituate and Woodbridge soils are in lower landscape positions. The Canton, Charlton, and Gloucester soils have a friable substratum and are on similar landscape positions. The Essex soils are sandier. The Paxton soils contain less sand in the substratum and are on similar landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods in winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is a main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill generally are needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The seasonal high water table and the restricted permeability are also main limitations for septic tank absorption fields.

This map unit is in capability subclass VIIs.

PaB—Paxton fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 300 feet in length. The areas are rectangular and range from 20 to 40 acres.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is moderate. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to reduce runoff and erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Constructing roads on well compacted, coarse-textured material and providing adequate side ditches and culverts will help protect the roads from damage caused by soil wetness and frost action. The permeability of this soil restricts it from readily absorbing effluent from septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass IIe.

PaC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 200 to 400 feet in length. The areas are rectangular and range from 20 to 30 acres.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the hazard of erosion is moderate. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to reduce runoff and erosion. Mixing crop residue and manure into the surface layer improves tilth and increases the organic matter content of the soil. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping

designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Land shaping is necessary in some areas. Constructing roads on the contour and on well compacted, coarse-textured base material will help protect them from damage caused by soil wetness and frost action. Planting grasses on roadbanks will help to reduce the erosion hazard. The restricted permeability of this soil is the main limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass IIIe.

PbB—Paxton fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 300 feet in length. The areas are irregular in shape and range from 25 to 80 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but it is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Constructing roads on well compacted, coarse-textured material and providing adequate side ditches and culverts will help protect the roads from damage caused by soil wetness and frost action. The permeability of this soil restricts it from readily absorbing effluent from septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIs.

PbC—Paxton fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 200 to 400 feet in length. The areas are irregular in shape and range from 25 to 60 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield

soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but it is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Constructing roads on well compacted, coarse-textured material and providing adequate side ditches and culverts will help protect the roads from damage caused by soil wetness and frost action. The permeability of this soil restricts it from readily absorbing effluent from septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIs.

PcB—Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly convex, and typically are 100 to 300 feet in length. The areas are irregular in shape and range from 30 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Constructing roads on well compacted, coarse-textured material and providing adequate side ditches and culverts will help protect the roads from damage caused by soil wetness and frost action. The permeability of this soil restricts it from readily absorbing effluent from septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIIs.

PcC—Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are convex, and typically are 200 to 800 feet in length. The areas are irregular in shape and range from 25 to 60 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 8 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile lines around the basement level will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Land shaping is necessary in some areas. Constructing roads on the contour and on well compacted, coarse-textured base material will help protect them from damage caused by soil wetness and frost action. Planting grasses on roadbanks will help to reduce the erosion hazard. The restricted permeability of this soil is the main limitation for septic tank absorption fields. Installing a larger-than-average drain field will help to overcome this limitation.

This map unit is in capability subclass VIIs.

PcD—Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and ridges. Slopes are smooth, are convex, and typically are 200 to 1,000 feet in length. The areas are irregular in shape and range from 30 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum is dark grayish brown to a depth of 65 inches or more. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Montauk, Woodbridge, Ridgebury, Brookfield, Canton, and Brimfield soils. The Charlton and Canton soils have a friable substratum and are in similar landscape positions. The Montauk soils are in similar landscape positions and contain more sand in the substratum. The Woodbridge and Ridgebury soils are in lower landscape positions. The Brookfield and Brimfield soils are redder and are in transitional areas. Also included are similar soils that are nearly level. Inclusions make up about 20 percent of the map unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and

spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope is a main limitation of the soils as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIIs.

PeE—Paxton and Montauk fine sandy loams, steep, extremely stony. This unit consists of very deep, well drained soils on the upper sides and tops of hills and ridges. Slopes are generally smooth and convex. Slopes typically are 200 to 1,000 feet long and range from 15 to 35 percent. The areas are irregular in shape and range from 50 to 300 acres. Stones on the surface are 5 to 20 feet apart. Some areas of this map unit consist of Paxton soils, some of Montauk soils, and some of both. The soils were mapped together because there are no major differences in their use and management. The total acreage of the unit is about 40 percent Paxton soils, 40 percent Montauk soils, and 20 percent other soils.

Typically, the Paxton soils have a surface layer of very friable, very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is dark brown gravelly fine sandy loam about 20 inches thick. It is very friable in the upper 8 inches and friable in the lower 12 inches. The substratum extends to a depth of 65 inches or more and is dark grayish brown. It is friable gravelly sandy loam in the upper 4 inches and firm gravelly fine sandy loam below that.

Typically, the Montauk soils have a surface layer of very friable, very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is friable and about 18 inches thick. It is strong brown gravelly fine sandy loam in the upper 11 inches and light olive brown gravelly sandy loam in the lower 7 inches. The substratum is very firm, gray gravelly loamy coarse sand to a depth of 65 inches or more.

Included with these soils in mapping are small areas of Ridgebury, Canton, Scituate, Charlton, and Woodbridge soils. The Ridgebury soils are poorly drained and are in lower landscape positions. The Canton and Charlton soils are in similar landscape positions and have a friable substratum. The Scituate and Woodbridge soils are moderately well drained and are on lower side slopes.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid.

The permeability of this Montauk soil is moderate or moderately rapid in the subsoil and moderately slow or slow in the substratum. The available water capacity is moderate. The root zone extends into the subsoil, and root growth is restricted by the substratum. A seasonal high water table is perched above the substratum for brief periods during winter and spring and after prolonged rains. Reaction in unlimed areas ranges from extremely acid to strongly acid throughout the soils.

Most areas of this map unit are in woodland.

Slope and the stones on the surface make these soils poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation

grazing help maintain desirable plant species.

The potential productivity for northern red oak on these soils is moderate. Slope causes a hazard of erosion and limits the operation of equipment. Plant competition is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that absorb precipitation and reduce runoff and erosion. Thinning woodlands of undesired stock such as dead or diseased trees or removing trees in crowded areas will enhance growth and regeneration of preferred trees and will allow restocking or replanting of preferred trees. The removal or control of competing understory vegetation will allow optimum growth of new plantings. Hand planting is necessary on some slopes. Pruning is desirable for white pine and red pine.

Slope is a main limitation of this unit as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Designing buildings and lots to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this map unit. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The restricted permeability is an additional main limitation for septic tank absorption fields. It restricts the soils from readily absorbing effluent.

This map unit is in capability subclass VIIs.

Pg—Pits, gravel. This map unit consists of irregularly shaped areas from which gravel has been removed for construction purposes. The areas range mainly from 10 to 100 acres. The pits are 3 to 50 feet deep and mainly have steep sides and a nearly level floor. Piles of stones and boulders commonly are on the pit floor. Some areas have small pools of water.

These pits are generally devoid of vegetation, although some older ones have scattered bushes, grass, and annuals. Most pits are droughty, but some have been excavated to a depth below the seasonal high water table.

This map unit is generally poorly suited to farming, woodland, and residential development. Onsite investigation is necessary to determine the suitability for any proposed use.

This map unit is not assigned to a capability subclass.

Pv—Pootatuck fine sandy loam. This soil is very deep, nearly level, and moderately well drained. It is on flood plains adjacent to streams and rivers. Slopes are smooth, are slightly concave, and typically are 100 to 400 feet in length. The areas are long and narrow or irregular in shape and range from 20 to 40 acres.

Typically, the surface layer is very friable fine sandy loam 12 inches thick. It is very dark grayish brown in the upper 9 inches and dark brown in the lower 3 inches. The subsoil is mottled, is about 20 inches thick, and is very friable. It is multiple layers of brown, dark brown, and very dark grayish brown fine sandy loam and sandy loam. The substratum extends to a depth of 65 inches or more. It is loose, yellowish brown, stratified layers of coarse sand, sand, and fine sand.

Included with this soil in mapping are small areas of Rippowam and Scarboro soils in lower landscape positions. They make up 10 to 15 percent of the map unit.

The permeability of this Pootatuck soil is moderate or moderately rapid in the subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. This soil has a seasonal high water table in late fall, in winter, and in spring. Flooding is frequent and brief. Reaction in unlimed areas ranges from very strongly acid to slightly acid throughout the soil.

Most areas of this map unit are farmed. Some areas are in woodland.

This soil is suited to cultivated crops, hay, and pasture. The erosion hazard is slight. The main management concern is wetness caused by the seasonal high water table. The main management needs are installing field drains where needed and timing farming operations so that planting is done after the spring floods. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, rotation grazing, and restricted grazing when the soil is saturated help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is very high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

This soil is generally unsuitable as a site for buildings

or septic tank absorption fields because of the flooding and the seasonal high water table. Constructing roads on raised, coarse-textured fill material and providing side ditches and culverts will help protect the roads from damage caused by flooding.

This map unit is in capability subclass IIw.

RdB—Ridgebury fine sandy loam, 0 to 6 percent slopes. This soil is very deep, nearly level and gently sloping, and poorly drained. It is in depressions and along upland drainageways. Slopes are smooth, are slightly concave, and typically are 75 to 200 feet in length. The areas are long and narrow and irregular in shape and range from 20 to 30 acres.

Typically, the surface layer is friable, black fine sandy loam about 5 inches thick. The subsoil is about 13 inches thick. It is friable, dark brown sandy loam in the upper 4 inches and dark gray gravelly sandy loam in the lower 9 inches. It is mottled in the lower part. The substratum extends to a depth of 65 inches or more. It is firm, gray gravelly sandy loam that is mottled in the upper part.

Included with this soil in mapping are small areas of Whitman, Woodbridge, Paxton, and Scituate soils. The Whitman soils are in slightly lower landscape positions. The Woodbridge, Scituate, and Paxton soils are better drained and are upslope. Also included are similar soils that are redder in the subsoil. Included soils make up about 20 percent of the map unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. The available water capacity is low. The root zone extends to the substratum. This soil has a seasonal high water table in late fall, in winter, and in spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is suited to cultivated crops, hay, and pasture. The seasonal high water table keeps the soil saturated through late spring. The erosion hazard is slight. The main management needs are installing field drains where feasible, proper timing of farming operations, and use of water-tolerant plant species. Proper stocking rates, deferred grazing, rotation grazing, and restricted grazing when the soil is saturated help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Soil moisture, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that the residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less will help prevent windthrow. Onsite investigation in some areas will determine the special treatment needed for some plantings.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass IIIw.

ReA—Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony. This soil is very deep, nearly level, and poorly drained. It is in depressions and along upland drainageways. Slopes are smooth, are slightly concave, and typically are 75 to 200 feet in length. The areas are long and narrow or irregular in shape and range from 20 to 50 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is friable, black fine sandy loam about 5 inches thick. The subsoil is about 13 inches thick. It is friable, dark brown sandy loam in the upper 4 inches and dark gray gravelly sandy loam in the lower 9 inches. It is mottled in the lower part. The substratum extends to a depth of 65 inches or more. It is firm, gray gravelly sandy loam that is mottled in the upper part.

Included with this soil in mapping are small areas of Whitman, Woodbridge, Paxton, and Scituate soils. The Whitman soils are in slightly lower landscape positions. The Woodbridge, Scituate, and Paxton soils are better drained and are upslope. Also included are similar soils that are redder in the subsoil. Included soils make up about 20 percent of the map unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. The available water capacity is low. The root zone extends to the substratum. This soil has a seasonal high water table in late fall, in winter, and in spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from very strongly

acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity of northern red oak on this soil is moderate. Soil moisture, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that the residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less will help prevent windthrow. Onsite investigation in some areas will determine the special treatment needed for some plantings.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

ReB—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and poorly drained. It is in depressions and along upland drainageways. Slopes are smooth, are slightly concave, and typically are 75 to 200 feet in length. The areas are long and narrow or irregular in shape and range from 20 to 75 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is friable, black fine sandy loam about 5 inches thick. The subsoil is about 13 inches thick. It is friable, dark brown sandy loam in the upper 4 inches and dark gray gravelly sandy loam in the lower 9 inches. It is mottled in the lower part. The substratum extends to a depth of 65 inches or more. It is firm, gray gravelly sandy loam that is mottled in the upper part.

Included with this soil in mapping are small areas of Whitman, Woodbridge, Paxton, and Scituate soils. The Whitman soils are in slightly lower landscape positions. The Woodbridge, Scituate, and Paxton soils are better drained and are upslope. Also included are similar soils that are redder in the subsoil. Included soils make up about 20 percent of the map unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. The available water capacity is low. The root zone extends to the substratum. This soil has a seasonal high water table in late fall, in winter, and in spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from very strongly acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Soil moisture, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that the residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less will help prevent windthrow. Onsite investigation in some areas will determine the special treatment needed for some plantings.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

Rm—Rippowam fine sandy loam. This soil is very deep, nearly level, and poorly drained. It is on flood plains adjacent to streams and rivers. Slopes are smooth and slightly concave and typically are 50 to 100 feet in length. The areas are crescent shaped or irregular in shape and range from 20 to 30 acres.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 7 inches thick.

The substratum extends to a depth of 65 inches or more. The upper part of the substratum is mottled and very friable and is about 15 inches thick. It is very dark gray in the upper 10 inches and very dark grayish brown in the lower 5 inches. The lower part of the substratum is very dark gray, stratified loamy sand, sand, coarse sand, and gravel. It is very friable in the upper 6 inches and loose below that.

Included with this soil in mapping are small areas of Pootatuck and Scarboro soils. The Pootatuck soils are at higher landscape positions, and the Scarboro soils are at slightly lower landscape positions. Included soils make up about 15 percent of the map unit.

The permeability of this Rippowam soil is moderate or moderately rapid in the upper part and rapid or very rapid in the lower part. The available water capacity is high. The root zone extends into the substratum. This soil has a seasonal high water table in late fall, in winter, and in spring. Flooding is frequent and brief. Reaction in unlimed areas ranges from very strongly acid to slightly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is suited to cultivated crops, hay, and pasture. The erosion hazard is slight. The seasonal high water table keeps the soil saturated through late spring. The main management needs are installing field drains where feasible, using water-tolerant plant species, and timing farming operations so that planting is done after the spring floods. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, rotation grazing, and restricted grazing when the soil is saturated help maintain desirable pasture plant species.

The potential productivity for red maple on this soil is moderate. Soil moisture, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that the residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less will help prevent windthrow. Onsite investigation in some areas will determine the special treatment needed for some plantings.

This soil is generally unsuitable as a site for buildings or septic tank absorption fields because of the flooding. Also, this soil does not adequately filter effluent. Constructing roads on raised, well compacted fill material and providing adequate side ditches and culverts help protect the roads from flood and frost damage.

This map unit is in capability subclass IVw.

Sb—Scarboro-Rippowam complex. This unit consists of very deep, nearly level soils in low areas, in depressions, and along drainageways. Slopes are smooth, are slightly concave, and typically are 50 to 200 feet in length. The areas are oval or irregular in shape and range from 10 to 40 acres. They consist of about 40 percent very poorly drained Scarboro soils, 30 percent poorly drained Rippowam soils, and 30 percent other soils. The areas of these soils are so small or so intricately mixed that it was not practical to map them separately.

Typically, the surface of the Scarboro soil is covered by black muck 5 inches thick. The surface layer is mucky fine sandy loam about 10 inches thick. The substratum extends to a depth of 65 inches or more. It is gray and grayish brown loamy sand, sand, and gravel and is stratified in the lower part.

Typically, the Rippowam soil has a surface layer of very friable, very dark grayish brown fine sandy loam about 7 inches thick. The substratum extends to a depth of 65 inches or more. The upper part of the substratum is mottled and very friable and is about 15 inches thick. It is very dark gray in the upper 10 inches and very dark grayish brown in the lower 5 inches. The lower part of the substratum is very dark gray, stratified loamy sand, sand, coarse sand, and gravel. It is very friable in the upper 6 inches and loose below that.

Included with this unit in mapping are small areas of Swansea and Freetown soils formed in organic material in lower landscape positions.

The permeability of this Scarboro soil is rapid or very rapid. The permeability of this Rippowam soil is moderate or moderately rapid in the upper part and rapid or very rapid in the lower part. The available water capacity is moderate in the Scarboro soil and high in the Rippowam soil. The root zone extends into the substratum of both soils, but root growth is restricted by a seasonal high water table. The Scarboro soil is subject to ponding, and the Rippowam soil is subject to frequent flooding. Reaction is very strongly acid to slightly acid throughout these soils.

Most areas of this map unit are in woodland.

These soils are poorly suited to cultivated crops, hay, and pasture. The seasonal high water table, the flooding, and the ponding, which keeps the soil wet throughout the year, are the major limitations for farming.

The potential productivity for eastern white pine on the Scarboro soil is moderately high. The potential productivity for red maple on the Rippowam soil is moderate. Excess soil moisture, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less will help control windthrow. Onsite investigation in places will determine the special treatment needed for some trees.

This map unit is generally unsuitable as a site for buildings and septic tank absorption fields because of the flooding and ponding. Constructing roads on raised, coarse-textured fill material and providing adequate side ditches and culverts will help protect the roads from damage caused by flooding and ponding.

This map unit is in capability subclass Vw.

SgB—Scituate fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 200 to 500 feet in length. The areas are rectangular and range from 20 to 30 acres.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this map unit are farmed (fig. 4). Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas. Wetness is a main limitation, and the erosion hazard is moderate. The main management needs are erosion control and drainage. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass IIw.

SgC—Scituate fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 200 to 500 feet in length. The areas are rectangular and range from 20 to 30 acres.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of

Figure 4.—A pastured area of Scituate fine sandy loam, 3 to 8 percent slopes. The removal of stones has improved the pasture.

Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. Some areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas. Wetness is a main limitation, and the erosion hazard is moderate. The main management needs are

erosion control and drainage. Conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

Potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass IIIe.

ShB—Scituate fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 200 to 500 feet in length. The areas are irregular in shape and range from 20 to 30 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIs.

ShC—Scituate fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 300 to 600 feet in length. The areas are irregular in shape and range from 20 to 50 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, but the soil is suited to hay and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIs.

StB—Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 200 to 500 feet in length. The areas are irregular in shape and range from 20 to 30 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface

water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

StC—Scituate fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and moderately well drained. It is on the lower slopes of hills and ridges. Slopes are smooth, are slightly concave, and typically are 300 to 600 feet in length. The areas are irregular in shape and range from 20 to 50 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and mottled, very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, Woodbridge, Paxton, and Ridgebury soils. The Montauk and Paxton soils are at higher landscape positions. The Woodbridge and Ridgebury soils are in lower landscape positions. The Canton soils have a friable substratum and are on side slopes. Included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This unit is in capability subclass VIIs.

StD—Scituate fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and moderately well drained. It is on the sides of hills and ridges. Slopes are smooth, are slightly concave, and typically are 300 to 600 feet in length. The areas are irregular in shape and range from 20 to 80 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, black fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is very friable, strong brown fine sandy loam in the upper 16 inches and very friable, yellowish brown sandy loam in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is firm, yellowish brown very gravelly loamy sand that is mottled in the upper part.

Included with this soil in mapping are small areas of Montauk, Canton, and Paxton soils that are upslope from Scituate soils and are better drained than Scituate soils. These included soils make up about 20 percent of this map unit.

The permeability of this Scituate soil is moderate in the subsoil and slow in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from

extremely acid to moderately acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope and the seasonal high water table are main limitations of the soil as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Constructing buildings without basements on lots designed to conform to the natural slope of the land will help to overcome the slope and the water table. Tile drains around foundations and landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil moisture. Large amounts of fill are generally needed for roads on this map unit. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The restricted permeability of this soil is an additional main limitation for septic tank absorption fields. Installing distribution lines across the slope will help to lessen the severity of these limitations, but additional precautionary measures are necessary in some areas.

This map unit is in capability subclass VIIs.

SuA—Sudbury fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is in large, broad areas. Slopes are smooth, are slightly concave, and typically are 100 to 400 feet in length. The areas are irregular in shape and range from 20 to 30 acres.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is very friable and about 13 inches thick. It is dark yellowish brown sandy loam in the upper 7 inches and mottled, yellowish brown loamy sand in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is loose, light brownish gray sand and gravel that is mottled in the upper part.

Included with this soil in mapping are small areas of Merrimac, Deerfield, Walpole, and Scarboro soils. The Merrimac soils are better drained and are in higher landscape positions. The Deerfield soils contain less gravel and are on similar landscape positions. The Walpole and Scarboro soils are more poorly drained and are in lower landscape positions. Included soils make up about 20 percent of this unit.

The permeability of this Sudbury soil is moderately rapid or rapid in the subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring. Reactions in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. A few areas are in woodland, and some areas are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is slight. Wetness is the major management concern, and subsurface drains are needed in places. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against wetness. Raised, coarse-textured base material and adequate side ditches and

culverts will help to overcome the wetness limitation and protect the roads from frost damage. Poor filtering capacity is an additional limitation of the soil as a site for septic tank absorption fields. It causes a hazard of pollution to ground water. Placing distribution lines in a mound of more suitable fill material will help to overcome the wetness and the poor filtering.

This map unit is in capability subclass IIw.

SuB—Sudbury fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is in large, broad areas and long narrow areas. Slopes are smooth, are slightly concave, and are typically 100 to 200 feet in length. Areas are irregular in shape and range from 20 to 30 acres in size.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 10 inches thick. The subsoil is very friable and about 13 inches thick. It is dark yellowish brown sandy loam in the upper 7 inches and mottled, yellowish brown loamy sand in the lower 6 inches. The substratum extends to a depth of 65 inches or more. It is loose, light brownish gray sand and gravel that is mottled in the upper part.

Included with this soil in mapping are small areas of Merrimac, Deerfield, Walpole, and Scarboro soils. The Merrimac soils are better drained and are in higher landscape positions. The Deerfield soils contain less gravel and are on similar landscape positions. The Walpole and Scarboro soils are more poorly drained and are in lower landscape positions. Included soils make up about 20 percent of this unit.

The permeability of this Sudbury soil is moderately rapid or rapid in the subsoil and rapid in the substratum. The available water capacity is moderate. The root zone extends to the substratum. This soil has a seasonal high water table in winter and spring. Reaction in unlimed areas ranges from extremely acid to moderately acid throughout the soil.

Many areas of this map unit are farmed. A few areas are in woodland, and some are used as homesites.

This soil is well suited to cultivated crops, hay, and pasture. Good tilth is easily maintained in cultivated areas, and the erosion hazard is moderate. Wetness is the major management concern, and subsurface drains are needed in places. Conservation tillage, contour tillage, cover crops, and grasses and legumes in the cropping system help to reduce runoff and control erosion. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against wetness. Raised, coarse-textured base material and adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. Poor filtering capacity is an additional limitation of the soil as a site for septic tank absorption fields. It causes a hazard of pollution to ground water. Placing distribution lines in a mound of more suitable fill material will help to overcome the wetness and the poor filtering.

This map unit is in capability subclass IIe.

Sw—Swansea muck. This soil is very deep, nearly level, and very poorly drained. It is in depressions and on plane areas. Slopes are smooth, are slightly concave, and typically are 100 to 800 feet in length. The areas are circular or irregular in shape and range from 20 to 30 acres.

Typically, this soil consists of black and very dark brown decomposed organic matter to a depth of about 48 inches. Below this, to a depth of 65 inches or more, is very friable, gray loamy fine sand.

Included with this soil in mapping are small areas of Freetown, Whitman, and Scarboro soils. The Freetown soils formed in deeper organic material and are near the middle of the map unit. The Whitman and Scarboro soils formed in mineral material and are at the fringes of the map unit. Included soils make up about 20 percent of the map unit.

The permeability of this Swansea soil is moderate or moderately rapid in the organic material and very rapid in the substratum. The available water capacity is high.

The root zone extends to a high water table at or near the surface throughout the year. Reaction is extremely acid in the organic material and ranges from extremely acid to strongly acid in the substratum.

Most areas of this soil are in woodland.

This soil is poorly suited to cultivated crops, hay, and pasture because of the seasonal high water table. The areas of this soil are difficult to drain because of the lack of suitable outlets. The plant cover is easily cut and dislodged by the hoofs of animals.

The potential productivity for red maple on this soil is moderate. The water table, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less helps to control windthrow. Onsite investigation is needed in places to determine the special treatment for some trees.

This soil is generally unsuitable as a site for buildings and septic tank absorption fields because of ponding. In addition, this soil does not adequately filter the effluent, causing a hazard of pollution to ground water. Constructing roads on raised, coarse-textured fill material and providing adequate side ditches and culverts help protect the roads from damage caused by ponding, frost action, and low soil strength.

This map unit is in capability subclass Vw.

Wa—Walpole fine sandy loam. This soil is very deep, nearly level, and poorly drained. It is in low areas, in depressions, and along drainageways. Slopes are smooth, are slightly concave, and typically are 100 to 400 feet in length. The areas are long and narrow or irregular in shape and range from 20 to 40 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very friable, very dark gray fine sandy loam about 3 inches thick. The subsoil is mottled, very friable, and about 20 inches thick. It is dark brown fine sandy loam in the upper 12 inches and grayish brown sandy loam in the lower 8 inches. The substratum extends to a depth of 65 inches or more. It is grayish brown, stratified loamy sand, coarse sand, sand, and gravel. It is very friable in the upper 6 inches and loose below that.

Included with this soil in mapping are a few small areas of Sudbury, Deerfield, and Swansea soils. The Swansea soils formed in organic material and are near the center of the map unit. The Sudbury and Deerfield soils are better drained and are in slightly higher landscape positions. Included soils make up about 20 percent of the map unit.

The permeability of this Walpole soil is moderately rapid in the subsoil and rapid or very rapid in the substratum. The available water capacity is moderate. The root zone extends into the substratum. This soil has a seasonal high water table in fall, winter, and spring. Reaction in unlimed areas ranges from very strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is suited to cultivated crops, hay, and pasture. The seasonal high water table keeps the soil saturated through late spring. The erosion hazard is slight. The main management needs are installing field drains where feasible, proper timing of farming operations, and use of water-tolerant plant species. Mixing crop residue and manure into the surface layer improves tilth and increases organic matter content. Proper stocking rates, deferred grazing, rotation grazing, and restricted grazing when the soil is saturated help maintain desirable pasture plant species.

The potential productivity for red maple on this soil is moderate. The water table, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less helps to control windthrow. Onsite investigation is needed in places to determine the special treatment for some trees.

The seasonal high water table is the main limitation of the soil as a site for buildings, roads, and septic tank absorption fields. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against wetness. Raised, coarse-textured base material and adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. Poor filtering capacity is an additional limitation of the soil as a site for septic tank absorption fields. It causes a hazard of pollution to ground water. Placing distribution lines in a mound of more suitable fill material will help to overcome the wetness and the poor filtering.

This map unit is in capability subclass IIIw.

Wh—Whitman fine sandy loam, extremely stony. This soil is very deep, nearly level, and very poorly drained. It is in depressions and low areas on the uplands. Slopes are smooth, are slightly concave, and typically are 50 to 150 feet in length. The areas are irregular in shape and range from 20 to 30 acres. Stones on the surface are 5 to 20 feet apart. Slopes range from 0 to 3 percent.

Typically, the surface layer is very friable, black fine sandy loam about 8 inches thick. The subsoil is mottled gray and about 12 inches thick. It is friable fine sandy loam in the upper 8 inches and friable gravelly sandy loam in the lower 4 inches. The substratum is firm, mottled, gray sandy loam to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Ridgebury, Woodbridge, and Swansea soils. The Swansea soils formed in organic material and are near the center of the map unit. The Ridgebury and Woodbridge soils are better drained and are on slightly higher landscape positions. Included soils make up about 20 percent of this map unit.

The permeability of this Whitman soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. The available water capacity is low. The root zone extends to the substratum. This soil has a seasonal high water table in fall, winter, and spring. Reaction in unlimed areas ranges from very strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland.

This soil is poorly suited to cultivated crops, hay, and pasture. The seasonal high water table, which keeps the soil wet throughout the year, is the major limitation for farming. Installing drainage is difficult because the soil is clayey and many areas do not have adequate outlets. Grazing during wet periods causes surface compaction.

The potential productivity for eastern white pine on this soil is high. The water table, high seedling mortality, and a hazard of windthrow are the main management concerns. Low soil strength limits the use of equipment to periods when the soil is dry or frozen. Thinning so that residual stand density is at or slightly above standard stocking levels and the change in stand density is 30 percent or less helps to control windthrow. Onsite investigation is needed in places to determine the special treatment for some trees.

This soil is generally unsuitable for building site development because of ponding and is generally unsuitable as a site for septic tank absorption fields because of the ponding and because the permeability of this soil restricts it from readily absorbing effluent. Constructing roads on raised, coarse-textured fill material and providing adequate side ditches and culverts help protect the roads from damage caused by ponding and frost action.

This map unit is in capability subclass VIIs.

WnB—Windsor loamy sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are slightly convex, and typically are 100 to 500 feet in length. The areas are irregular in shape and range from 20 to 100 acres.

Typically, the surface layer is very friable, brown to dark brown loamy sand about 9 inches thick. The subsoil is about 19 inches thick. It is very friable, yellowish brown loamy sand in the upper 9 inches and loose, pale brown sand in the lower 10 inches. The substratum is loose, light gray sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Hinckley, Deerfield, and Sudbury soils. The Hinckley soils contain more rock fragments and are on similar landscape positions. The Deerfield and Sudbury soils are moderately well drained and are in low landscape positions. Included soils make up about 20 percent of this map unit.

The permeability of this Windsor soil is rapid or very rapid throughout the soil. The available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is suited to cultivated crops, hay, and pasture. The low available water capacity makes irrigation a major management concern. Conservation tillage, contour tillage, using cover crops and grasses and legumes in the cropping system, and mixing crop residue and manure into the surface layer help maintain tilth and increase the organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in

some areas. Minimizing soil disturbance to retain the spongelike mulch of leaves that absorb precipitation and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture.

This soil has no major limitations as a site for buildings and local roads. This soil readily absorbs but does not adequately filter the effluent from septic tank absorption fields, thus causing a hazard of pollution to ground water.

This map unit is in capability subclass IIIs.

WnC—Windsor loamy sand, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and excessively drained. It is in large, broad areas and long, narrow areas. Slopes are smooth, are convex, and typically are 100 to 400 feet in length. The areas are irregular in shape and range from 20 to 75 acres.

Typically, the surface layer is very friable, brown to dark brown loamy sand about 5 inches thick. The subsoil is about 19 inches thick. It is very friable, yellowish brown loamy sand in the upper 9 inches and loose, pale brown sand in the lower 10 inches. The substratum is loose, light gray sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Hinckley and Merrimac soils on similar landscape positions. The Hinckley and Merrimac soils contain more rock fragments. They make up about 20 percent of this map unit.

The permeability of this Windsor soil is rapid or very rapid throughout the soil. The available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is poorly suited to cultivated crops, hay, or pasture. The low available water capacity makes irrigation a major concern. The erosion hazard is moderate. Stripcropping, conservation tillage, contour tillage, and cover crops and grasses and legumes in the cropping system help reduce runoff and control erosion. Mixing crop residue and manure into the surface layer maintains tilth and increases the organic matter content. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. Seedling mortality is a hazard caused by the limited available water capacity of the soil. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing soil disturbance to retain the spongelike mulch of leaves that absorb precipitation and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture.

Slope is the main limitation of this soil as a site for buildings, roads, and septic tank absorption fields. Designing buildings to conform to the natural slope of the land will help to overcome the slope and reduce the erosion hazard in disturbed areas. Land shaping is necessary in some areas. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Installing distribution lines across the slope will help increase the suitability for septic tank absorption fields, but the poor filtering capacity of the soil causes a hazard of ground-water pollution.

This map unit is in capability subclass IVs.

WnD—Windsor loamy sand, 15 to 25 percent slopes. This soil is very deep, moderately steep, and excessively drained. It is in long, narrow areas. Slopes are simple to complex and typically are 100 to 200 feet in length. The areas are irregular in shape and range from 20 to 60 acres.

Typically, the surface layer is very friable, brown to dark brown loamy sand about 3 inches thick. The subsoil is about 19 inches thick. It is very friable, yellowish brown loamy sand in the upper 9 inches and loose, pale brown sand in the lower 10 inches. The substratum is loose, light gray sand to a depth of 65 inches or more.

Included with this soil in mapping are small areas of Hinckley and Merrimac soils on similar landscape positions. The Hinckley and Merrimac soils contain more rock fragments. They make up about 20 percent of this map unit.

The permeability of this Windsor soil is rapid or very rapid throughout the soil. The available water capacity is low. The root zone extends into the substratum. Reaction in unlimed areas is very strongly acid or strongly acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are farmed.

This soil is poorly suited to cultivated crops, hay, and pasture. The soil is droughty, and slope limits the use of

equipment. The erosion hazard is moderate.

The potential productivity for eastern white pine on this soil is high. Droughtiness and the hazard of erosion are management concerns. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance vigorous growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary for optimum growth of new seedlings in some areas. Minimizing disturbance to retain the spongelike mulch of leaves and designing regeneration cuts to optimize shade and reduce evapotranspiration will help to retain the limited soil moisture. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion.

Slope is a main limitation of the soils as a site for buildings, roads, and septic tank absorption fields. Extensive land shaping is generally needed. Buildings and lots designed to conform to the natural slope of the land will help to overcome the slope limitation and reduce the hazard of erosion in disturbed areas. Large amounts of fill are generally needed for roads on this soil. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. The poor filtering capacity of the soils is an additional limitation for septic tank absorption fields. It causes a hazard of pollution to ground water. Installing distribution lines across the slope will help overcome the slope, but additional precautionary measures are necessary in some areas to reduce the pollution hazard.

This map unit is in capability subclass VIs.

WsB—Woodbridge fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and moderately well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly concave, and typically are 100 to 400 feet in length. The areas are rectangular and range from 20 to 50 acres. Stones on the surface are 20 to 50 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is very friable and about 15 inches thick. It is brown fine sandy loam in the upper 6 inches and mottled, dark brown sandy loam in the lower 9 inches. The substratum is grayish brown and extends to a depth of 65 inches or more. It is mottled, friable sandy loam in the upper 4 inches and very firm fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Paxton, Canton, Montauk, and Ridgebury soils. The Charlton and Canton soils are better drained, have a friable substratum, and are on higher landscape positions. The Paxton and Montauk soils are better drained and are on higher landscape positions. The Ridgebury soils are more poorly drained and are in lower landscape positions. Included soils make up about 20 percent of this map unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. The available water capacity is moderate. The root zone extends to the very firm part of the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are farmed, and some are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops. Proper stocking rates, deferred grazing, and rotation grazing help to maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurfacewater. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIs.

WtB—Woodbridge fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and moderately well drained. It is on the tops and upper parts of hills and ridges. Slopes are smooth, are slightly concave, and typically are 100 to 400 feet in

Figure 5.—An area of Woodbridge fine sandy loam, 3 to 8 percent slopes, extremely stony.

length. The areas are rectangular and range from 20 to 50 acres. Stones on the surface are 5 to 20 feet apart (fig. 5).

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is very friable and about 15 inches thick. It is brown fine sandy loam in the upper 6 inches and mottled, dark brown sandy loam in the lower 9 inches. The substratum is grayish brown and extends to a depth of 65 inches or more. It is mottled, friable sandy loam in the upper 4 inches and very firm fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Paxton, Canton, Montauk, and Ridgebury soils. The Charlton and Canton soils are better drained, have a friable substratum, and are on higher landscape positions. The Paxton and Montauk soils are better drained and are on higher landscape positions. The Ridgebury soils are more poorly drained and are in lower landscape positions. Included soils make up about 20 percent of this map unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. The available water capacity is moderate. The root zone extends to the very firm part of the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing

maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Constructing buildings with tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on raised, coarse-textured base material and providing adequate side ditches and culverts will help to overcome the wetness limitation and protect the roads from frost damage. The seasonal high water table and the restricted permeability of the soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

WtC—Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and moderately well drained. It is on the upper parts of hills and ridges. Slopes are smooth, are concave, and typically are 200 to 400 feet in length. The areas are irregular in shape and range from 20 to 100 acres. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is very friable and about 15 inches thick. It is brown fine sandy loam in the upper 6 inches and mottled, dark brown sandy loam in the lower 9 inches. The substratum is grayish brown and extends to a depth of 65 inches or more. It is mottled, friable sandy loam in the upper 4 inches and very firm fine sandy loam below that.

Included with this soil in mapping are small areas of Charlton, Paxton, Canton, Montauk, and Ridgebury soils. The Charlton and Canton soils are better drained, have a friable substratum, and are on higher landscape positions. The Paxton and Montauk soils are better drained and are on higher landscape positions. The Ridgebury soils are more poorly drained and are in lower landscape positions. Included soils make up about 20 percent of this map unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. The available water capacity is moderate. The root zone extends to the very firm part of the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. Some areas are used as homesites.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for eastern white pine on this soil is high. There are no major limitations for woodland management. Plant competition at the time of regeneration is moderate for conifers. Thinning crowded stands to standard stocking levels enhances growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings. Pruning improves the quality of white pine.

Slope and the water table are the main limitations of the soil as a building site. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping can be used to drain surface water away from buildings. Constructing roads on well compacted, coarse-textured base material will help protect the roads from frost damage. The seasonal high water table and restricted permeability of this soil are the main limitations for septic tank absorption fields. Placing distribution lines in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

WtD—Woodbridge fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and moderately well drained. It is on the sides of hills and ridges. Slopes are smooth, are concave, and are typically 300 to 800 feet in length. Areas are irregular in shape and range from 20 to 100 acres in size. Stones on the surface are 5 to 20 feet apart.

Typically, the surface layer is very friable, very dark grayish brown fine sandy loam about 6 inches thick. The subsoil is very friable and about 15 inches thick. It is brown fine sandy loam in the upper 6 inches and

mottled, dark brown sandy loam in the lower 9 inches. The substratum is grayish brown and extends to a depth of 65 inches or more. It is mottled, friable sandy loam in the upper 4 inches and very firm fine sandy loam below that.

Included with this soil are small areas of Charlton, Paxton, Canton, and Montauk soils. The Charlton and Canton soils are better drained, have a friable subsoil, and are upslope. The Paxton and Montauk soils are better drained and are upslope. Included soils make up about 20 percent of this map unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. The available water capacity is moderate. The root zone extends to the very firm part of the substratum. This soil has a seasonal high water table in winter and spring and for short periods after prolonged rains. Reaction in unlimed areas ranges from strongly acid to medium acid throughout the soil.

Most areas of this map unit are in woodland. A few areas are used as homesites.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Proper stocking rates, deferred grazing, and rotation grazing help maintain desirable pasture plant species.

The potential productivity for northern red oak on this soil is moderate. Slope limits the use of equipment, and erosion is a hazard. Plant competition at the time of regeneration is moderate for conifers. Constructing access roads and trails at grades of between 2 and 10 percent and installing water bars will help to prevent excessive soil erosion. Keeping soil disturbance to a minimum will help retain the spongelike mulch of leaves that reduce runoff and erosion. Thinning crowded stands to standard stocking levels and removing diseased, poorly formed, and otherwise undesirable trees will enhance growth. Shelterwood cutting, seed-tree cutting, and clearcutting help natural regeneration and provide suitable planting sites. Removal or control of competing vegetation is necessary in some areas for optimum growth of new seedlings.

Slope and the water table are the main limitations of the soil as a building site. Constructing buildings without basements or above the seasonal high water table will help to avoid the damage caused by the water table. Tile drains around foundations will help to remove excess subsurface water. Landscaping designed to drain surface water away from buildings will provide added protection against damage caused by soil wetness. Constructing roads on the contour and planting grasses on roadbanks will help to reduce the erosion hazard. Well compacted, coarse-textured base material will help protect roads from frost damage. The seasonal high water table, slope, and restricted permeability are the main limitations for septic tank absorption fields. Distribution lines installed across the slope in a mound of more suitable fill material will help to overcome these limitations.

This map unit is in capability subclass VIIs.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. Identification of prime farmland is a major step in meeting the Nation's needs for food and fiber.

The U.S. Department of Agriculture defines prime farmland as the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops while using acceptable farming methods. Prime farmland produces the highest yields and requires minimal amounts of energy and economic resources, and farming it results in the least damage to the environment.

An area identified as prime farmland must be used for producing food or fiber or must be available for those uses. Thus, urban and built-up land and water areas are not classified as prime farmland.

The general criteria for prime farmland are as follows: a generally adequate and dependable supply of moisture from precipitation or irrigation, favorable temperature and growing-season length, acceptable levels of acidity or alkalinity, few or no rocks, and permeability to air and water. Prime farmland is not excessively erodible, is not saturated with water for long periods, and is not flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

The survey area contains about 6,300 acres of prime farmland. That acreage makes up about 5 percent of the total acreage in the survey area and is mainly in the western part of the survey area.

The soil map units that make up prime farmland in the survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4, and the location of each unit is shown on the detailed soil maps at the back of this publication. The soil properties and characteristics that affect use and management of the units are described in the section "Detailed Soil Map Units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

C.G. Moustakis, former resource conservationist, Soil Conservation Service, assisted with this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Crops and pasture cover about 10,000 acres in the survey area. Of this acreage, about 70 percent is used for hay and pasture, 28 percent for row crops, under 1 percent for orchards and nursery stock, and about 1 percent for other uses.

Erosion is a major concern on much of the cropland and pasture in the survey area. Erosion is a hazard on soils where slope exceeds 3 percent. Some Paxton soils, for example, have slopes of more than 3 percent and are erodible (fig. 6).

Loss of the surface layer through erosion reduces productivity and causes mixing of part of the subsoil into the plow layer. Loss of the surface layer is especially damaging to soils that have a restrictive layer in or below the subsoil that limits the depth of the root zone. Examples of soils that have such a layer are Paxton and Woodbridge soils.

Erosion also causes the pollution of streams by sediment and lowers water quality for municipal use, for recreation, and for fish and wildlife and results in sediment-loading of ponds, road ditches, and culverts.

A cropping system that keeps plant cover on the soil for extended periods can hold erosion to a level that will not reduce the productive capacity of the soil. On livestock farms, which consist principally of pasture and hayland, the legumes and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve tilth for the succeeding crop in the crop rotation system.

Figure 6.—Gully erosion on Paxton fine sandy loam, 8 to 15 percent slopes.

Practices that help to control erosion are terracing, contouring, and stripcropping. Many parts of the survey area have short, irregular slopes that are not suited to terraces, but using diversions at right angles to the slopes of such areas intercepts runoff water, guides it off the land safely, and protects other fields.

Stripcropping, in which alternate strips of row crops and close-growing crops are planted across the slope, is also effective in controlling erosion. Stripcropping is best suited to soils that have long, uniform slopes.

Fields in the survey area that are not suited to structures for erosion control can be protected through the use of a cropping system. For example, 1 or 2 years of row crops followed by several years of grass-legume mixtures will keep a plant cover on the soil for extended periods. Conservation tillage or no-till farming of crops that normally are intertilled protects soil from excessive erosion. These systems can be applied on most soils in the area.

Drainage is a major concern for many soils in the survey area. Some soils are so wet that the production of crops common to the area generally is not feasible.

Examples of such soils are very poorly drained Scarboro and Whitman soils.

Poorly drained soils, such as Ridgebury and Walpole soils, are too wet for good crop production during most years. Random tile drainage, drainage ditches, and use of moisture-tolerant crops are effective measures for farming these soils.

Moderately well drained soils cannot be tilled or worked until late spring or early summer and are not well suited to early-season crops. The Woodbridge, Sudbury, and Deerfield soils are examples of moderately well drained soils.

Fertility is low in the soils of the survey area. Most of the soils are naturally strongly acid or very strongly acid. They thus require applications of lime to lower acidity sufficiently for crops that grow best on slightly acid or nearly neutral soils. Available phosphorus and potash levels are naturally low, making the addition of fertilizer necessary.

Tilth is important to the germination of seeds and the infiltration of water into the soil. Soils that have good tilth are granular and porous. Many of the soils used for crops in the survey area are light in color and low in organic matter content. Generally, the surface layer of these soils is granular and has good tilth. Regular use of green-manure crops and additions of crop residue and animal manure help to maintain organic matter content, soil structure, and desirable water infiltration rates.

Special crops grown commercially in the survey area are vegetables, fruits, and nursery plants. The common crops are squash, sweet corn, tomatoes, and strawberries. Apples are the major tree fruit grown in the area.

Deep, friable soils that have good natural drainage are especially well suited to many vegetables. These include Merrimac soils that have slopes of less than 8 percent. If irrigated, the Hinckley and Windsor soils that have slopes of less than 8 percent are also suited to vegetables and fruits. Most of the well drained soils in the survey area are suited to orchards and nursery plants. Soils in low-lying areas, where frost is frequent and air drainage is poor, are generally poorly suited to early-season vegetables, small fruits, and orchards.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. The levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

C.L. Angeloni, forester, Massachusetts Department of Environmental Management, and D.J. Welsch, forester, Soil Conservation Service, assisted with this section.

Forests cover about 70 percent of the survey area, or about 100,000 acres. The dominant forest cover is oak. Stands of red maple are on the wetter areas, mainly on Ridgebury soils, and stands of white pine are on the drier areas, mainly on Hinckley soils. In general, the soils in this survey area are capable of supporting northern red oak, red maple, sugar maple, eastern white pine, and ash. The major markets for the wood in the survey area are for raw logs, veneer logs, and firewood.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed in the tables. The table gives the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, that the indicator species can produce. The larger the number, the greater the potential productivity. The number 1 indicates low productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 through 8, high; 9 through 11, very high; and 12 or more, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates steep slopes; *X*, stones or rocks on the surface; *W*, excessive water in or on the soil; *T*, excessive alkalinity, acidity, sodium salts, or other toxic substances in the soil; *D*, restricted rooting depth caused by bedrock, hardpan, or other restrictive layer; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, high content of rock fragments in the soil profile. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that erosion can occur as a result of site preparation or following cutting operations and where the soil is exposed, for example,

roads, skid trails, fire lanes, and log handling areas. Forests that are abused by fire or overgrazing are also subject to erosion. The ratings for the erosion hazard are based on the percent of the slope and on the erosion factor K shown in table 16. A rating of *slight* indicates that no particular measures to prevent erosion are needed under ordinary conditions. A rating of *moderate* indicates that erosion control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

The proper construction and maintenance of roads, trails, landings, and fire lanes will help overcome the erosion hazard.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that equipment use normally is not restricted either in kind of equipment that can be used or time of year because of soil factors. If soil wetness is a factor, equipment use can be restricted for a period not to exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If soil wetness is a factor, equipment use is restricted for 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either in kind of equipment or season of use. If soil wetness is a factor, equipment use is restricted for more than 3 months.

Choosing the most suitable equipment and timing harvesting and other management operations to avoid seasonal limitations help overcome the equipment limitation.

Seedling mortality refers to the probability of death of naturally occurring or planted tree seedlings as influenced by kinds of soil or topographic conditions. The factors considered in rating the soils for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and aspect of the slope. A rating of *slight* indicates that under usual conditions the expected mortality is less than 25 percent. A rating of *moderate* indicates that the expected mortality is 25 to 50 percent. Extra precautions are advisable. A rating of *severe* indicates that the expected mortality is more than 50 percent. Extra precautions are important. Replanting may be necessary.

The use of special planting stock and special site preparation, such as bedding, furrowing, or surface drainage, can help reduce seedling mortality.

Windthrow hazard is the likelihood of trees being uprooted (tipped over) by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions are a seasonal high water table and bedrock or a fragipan or other limiting layer. A rating of *slight* indicates that normally no trees are blown down by the wind. Strong winds may break trees but do not uproot them. A rating of *moderate* indicates that moderate or strong winds occasionally blow down a few trees during periods of soil wetness. A rating of *severe* indicates that moderate or strong winds may blow down many trees during periods of soil wetness.

The use of specialized equipment that does not damage surficial root systems during partial cutting operations can help reduce windthrow. Care in thinning or no thinning also can help reduce windthrow.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Common trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *productivity class*, a number, represents an expected volume produced by the most important trees. This number, expressed as cubic meters per hectare per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand. One cubic meter per hectare equals 14.3 cubic feet per acre.

The first tree species listed under common trees for a soil is the indicator species for that soil. The indicator species is the species that is common in the area and is generally the most productive on the soil. The productivity class of the indicator species is the number used for the ordination symbol.

Trees to plant are those that are suited to the soil and are planted for commercial wood production.

Recreation

H.J. Ritzer, former assistant resource conservationist, Soil Conservation Service, assisted with this section.

Paths and trails for hiking, cross-country skiing, and horseback riding are the most suitable recreation facilities for a significant portion of the survey area, and there is an extensive system of trails in the area, including a section of the Metacomet and Monadnock Hiking Trail.

Several large public land holdings in the survey area are suited to a variety of recreation, including trail activities, camping, picnicking, and hunting. Some of the land designated for water-supply protection is restricted to hiking use only; and on some others picnicking and fishing are permitted. These lands include the Quabbin Reservoir property (12,400 acres) and the land managed by several community water departments (some 8,000 acres total). In several towns, use of up to one-third of the total acreage is restricted by a water department.

Some other public lands in the survey area are less restrictive and have potential or are used for hiking, cross-country skiing, snowmobiling, horseback riding, camping, fishing, and hunting. These include the Brimfield State Forest (3,000 acres), the Swift River Wildlife Management Area (1,000 acres), the U.S. Army Corps of Engineers reservoir land in East Brimfield (1,100 acres), and the University of Massachusetts Cadwell Memorial Forest (1,195 acres).

Various town commissions also own and manage land for conservation and recreation. Public use of these lands for trail activities, nature study, and hunting and fishing is common. Most towns also provide athletic fields and playgrounds, and several golf courses are in the survey area.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

This survey area, consisting mostly of rural areas and small suburbs, offers a diversified wildlife habitat.

The common species are mourning dove, bluejay, chickadee, goldfinch, cardinal, cedar waxwing, mockingbird, robin, downy woodpecker, and gray squirrel.

Several large public lands are in the survey area, and most consist of hardwood forests. Although the primary uses of most of these areas are for recreation or watershed protection, the areas also provide habitat for a diverse wildlife community. The main species in these areas and in other large unaltered parts of the survey area are white-tailed deer, beaver, muskrat, turkey, bear, gray and red fox, raccoon, opossum, hawk, and a few golden or bald eagles and bobcats.

The Quabbin Reservoir and other lakes and ponds in the survey area provide habitat for lake trout, landlocked salmon, largemouth and smallmouth bass, bullhead, brown trout, rainbow trout, chain pickerel, and yellow and white perch. The brooks and rivers also provide habitat for brook trout and brown trout. The Massachusetts Division of Fisheries and Wildlife stocks public-access streams with brook, brown, and rainbow trout and manages native game fish in all public waters.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, timothy, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggar-ticks, quackgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, birch, cherry, maple, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are gray dogwood, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, yew, cedar, and hemlock.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil

properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, arrowhead, burreed, pickerel weed, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include kestrel, meadow vole, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, nuthatches, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, frogs, and tree swallows.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial

buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to

a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the

limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The

change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

Some soils in table 17 are assigned to two hydrologic soil groups. Dual grouping is used for some soils that are less than 20 inches deep to bedrock. The first letter applies to areas where the bedrock is cracked and pervious and the second letter to areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface of the soil.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional, common,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to

three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely, grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched, artesian,* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(4)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl*, meaning minimal horizonation, plus *aquepts*, the suborder of the Inceptisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is sandy, mixed, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (3)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (4)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Brimfield Series

Loamy, mixed, mesic Lithic Dystrochrepts.

The Brimfield series consists of shallow, somewhat excessively drained soils on uplands. The soils formed in loamy glacial till. Slopes range from 3 to 45 percent.

Brimfield soils are similar to Hollis soils and in many places are adjacent to Brookfield and Woodbridge soils. Brimfield soils have redder hue than Hollis soils and have bedrock at a shallower depth than Brookfield or Woodbridge soils.

Typical pedon of Brimfield fine sandy loam, in an area of Brookfield-Brimfield-Rock outcrop complex, steep, in woods 500 feet southeast of East Hill Road, 850 feet southwest of the Massachusetts Turnpike, in the town of Brimfield.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine tree roots; 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—2 to 8 inches; reddish brown (5YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium tree roots; 10 percent rock fragments; very strongly acid; clear smooth boundary.

Bw2—8 to 15 inches; strong brown (7.5YR 5/6) gravelly fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium tree roots; 15 percent gravel; strongly acid; abrupt smooth boundary.

R—15 inches; bedrock.

The solum is 10 to 20 inches thick. Rock fragments make up 5 to 20 percent of the solum. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. It is fine sandy loam, sandy loam, or loam in the fine earth fraction.

The B horizon has hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 4 to 6. It is fine sandy loam or sandy loam in the fine earth fraction.

Brookfield Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts.

The Brookfield series consists of very deep, well drained soils on uplands. The soils formed in loamy glacial till. Slopes range from 3 to 45 percent.

Brookfield soils are similar to Charlton soils and in many places are adjacent to Brimfield and Woodbridge soils. Brookfield soils have redder hue than Charlton and Woodbridge soils and are deeper to bedrock than Brimfield soils.

Typical pedon of Brookfield fine sandy loam, in woods, in an area of Brookfield-Brimfield-Rock outcrop complex, steep, east of East Hill Road, 600 feet south of the Massachusetts Turnpike, in the town of Brimfield.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine tree roots; 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—2 to 12 inches; reddish brown (5YR 4/4) fine sandy loam; massive; very friable; common fine and medium tree roots; 10 percent rock fragments; very strongly acid; gradual wavy boundary.

Bw2—12 to 28 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; common fine and medium tree roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

C—28 to 65 inches; strong brown (7.5YR 5/6) gravelly fine sandy loam; massive; friable; few medium roots in upper part; 15 percent rock fragments; moderately acid.

The solum thickness ranges from 24 to 30 inches. Gravel-size fragments make up 5 to 25 percent of the solum and 15 to 25 percent of the substratum. Reaction is very strongly acid to moderately acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 or 3. Texture is loam, fine sandy loam, or their gravelly analog. The upper part of the B horizon has hue of 5YR, value of 3 to 5, and chroma of 4 to 8. The lower part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The upper part of the B horizon is fine sandy loam or gravelly fine sandy loam, and the lower part is fine sandy loam, sandy loam, or their gravelly analog. The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam, sandy loam, or their gravelly analog.

Canton Series

Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts.

The Canton series consists of very deep, well drained soils on uplands. The soils formed in a loamy mantle overlying sandy glacial till on uplands. Slopes range from 3 to 45 percent.

Canton soils are similar to Gloucester soils and in many places are adjacent to Scituate and Montauk soils. Canton soils have a thicker A horizon than

Gloucester soils and do not have the dense substratum that is typical of Scituate and Montauk soils.

Typical pedon of Canton fine sandy loam, 3 to 8 percent slopes, extremely stony, in woods 150 feet south of Quabbin Reservation Gate 12 road, 3,100 feet east of Route 202, in the town of Pelham.

Ap—0 to 7 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many fine and medium tree roots; 5 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—7 to 15 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium tree roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

Bw2—15 to 26 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak medium subangular blocky structure; friable; few medium tree roots; 10 percent rock fragments; strongly acid; clear wavy boundary.

2C—26 to 65 inches; light olive gray (5Y 6/2) gravelly loamy sand; massive; very friable; few medium tree roots in upper part; 20 percent rock fragments; strongly acid.

The solum thickness ranges from 18 to 36 inches. Rock fragment content is 5 to 35 percent in the solum and 15 to 40 percent in the substratum. Reaction is extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is fine sandy loam, loam, or their gravelly analog.

The Bw1 horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. The Bw2 horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 4 to 6. The B horizon is fine sandy loam, loam, very fine sandy loam, or their gravelly analog.

The 2C horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 2 or 3. It is loamy sand, loamy coarse sand, or their gravelly analog.

Charlton Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts.

The Charlton series consists of very deep, well drained soils on uplands. The soils formed in loamy glacial till. Slopes range from 3 to 45 percent.

Charlton soils are similar to Brookfield soils and in many places are adjacent to Paxton and Woodbridge soils. Charlton soils have yellower hues than Brookfield soils and do not have the hardpan that is typical of the Paxton and Woodbridge soils.

Typical pedon of Charlton fine sandy loam, 3 to 8 percent slopes, 20 feet south of the power line and 50 feet west of Old Gilbertville Road, in the town of Ware.

A—0 to 2 inches; dark brown (7.5YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 10 percent rock fragments; very strongly acid; abrupt smooth boundary.

Bw1—2 to 9 inches; brown (7.5YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; many fine to coarse roots; 10 percent rock fragments; strongly acid; gradual smooth boundary.

Bw2—9 to 14 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; friable; many fine to coarse roots to a depth of 12 inches, few roots below; 10 percent rock fragments; strongly acid; gradual smooth boundary.

Bw3—14 to 25 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak medium and coarse subangular blocky structure; friable; few roots; 10 percent rock fragments; very strongly acid; gradual smooth boundary.

C—25 to 65 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; massive; friable; 10 percent rock fragments; very strongly acid.

The solum thickness ranges from 20 to 34 inches. Rock fragments make up 5 to 25 percent of the solum and 5 to 50 percent of the substratum. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 3. It is fine sandy loam or gravelly fine sandy loam.

The upper part of the B horizon has a hue of 7.5YR or 10YR, and the lower part has a hue of 10YR to 5Y. Value and chroma of the B horizon are 4 to 6. The B horizon is fine sandy loam, loam, sandy loam, or their gravelly analog.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It mainly is fine sandy loam, sandy loam, or their gravelly analog. Thin, horizontally discontinuous layers of loamy sand are common in some areas.

Deerfield Series

Mixed, mesic Aquic Udipsamments.

The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial

deposits on terraces, deltas, and outwash plains. Slopes range from 0 to 8 percent.

Deerfield soils are similar to Windsor soils and commonly are adjacent to Sudbury and Hinckley soils. Deerfield soils have mottles; Windsor and Hinckley soils do not. Deerfield soils have less gravel than Sudbury soils.

Typical pedon of Deerfield loamy fine sand, 0 to 3 percent slopes, in a hay field 10 feet east of Warren Wright Road, 40 feet north of its junction with Wilson Street, in the town of Belchertown.

Ap—0 to 6 inches; dark brown (7.5YR 3/2) loamy fine sand; weak fine granular structure; very friable; many fine grass roots; strongly acid; abrupt wavy boundary.

Bw1—6 to 16 inches; dark brown (7.5YR 4/4) loamy fine sand; massive; very friable; medium acid; clear wavy boundary.

Bw2—16 to 23 inches; strong brown (7.5YR 5/6) loamy sand; massive; very friable; moderately acid; clear wavy boundary.

C1—23 to 27 inches; dark yellowish brown (10YR 4/4) loamy sand; few fine faint gray (10YR 6/1) and light brownish gray (10YR 6/2) mottles; massive; very friable; moderately acid; clear wavy boundary.

C2—27 to 32 inches; brown (10YR 5/3) fine sand; common fine faint gray (10YR 6/1) and light brownish gray (10YR 6/2) mottles; massive; very friable; moderately acid; clear wavy boundary.

C3—32 to 65 inches; brown (10YR 5/3) stratified sand, coarse sand, and gravel; single grain; loose; moderately acid.

The solum thickness ranges from 20 to 30 inches. The content of rock fragments typically ranges from 0 to 5 percent but is as much as 20 percent fine gravel in individual strata. Reaction ranges from very strongly acid to slightly acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. It is loamy fine sand or fine sand. The B horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. It ranges from loamy fine sand to coarse sand. Mottles in the lower part are few or common and faint or distinct. The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It is coarse sand to loamy fine sand.

Essex Series

Sandy, mixed, mesic Typic Dystrochrepts.

The Essex series consists of very deep, well drained soils on uplands. The soils formed in a loamy mantle and in the underlying sandy glacial till. Slopes range from 3 to 45 percent.

Essex soils are similar to Montauk soils and in many places are adjacent to Scituate and Ridgebury soils. Essex soils have a thinner surface layer than Montauk soils and do not have the mottles that are typical in Scituate and Ridgebury soils.

Typical pedon of Essex gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony, in woods 30 feet northwest of Cedar Swamp Road, 1,400 feet northeast of its junction with Peck Brothers Road, in the town of Monson.

Oi—0 to 2 inches; decomposed leaves and stems.

A—0 to 3 inches; dark yellowish brown (10YR 3/4) gravelly fine sandy loam; weak fine and medium granular structure; very friable; many fine tree roots; 15 percent rock fragments; strongly acid; abrupt wavy boundary.

Bw1—3 to 15 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; many fine tree roots; 20 percent rock fragments; strongly acid; clear wavy boundary.

Bw2—15 to 26 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; massive; very friable; common fine and few coarse tree roots; 20 percent rock fragments; strongly acid; clear wavy boundary.

Bw3—26 to 29 inches; pale brown (10YR 6/3) gravelly loamy sand; massive; very friable; common fine and few coarse tree roots; 25 percent rock fragments; medium acid; clear wavy boundary.

Cd—29 to 65 inches; grayish brown (2.5Y 5/2) gravelly loamy sand; massive; firm; 27 percent rock fragments; medium acid.

The solum thickness, or the depth to the substratum, is 15 to 35 inches. The content of rock fragments ranges from 5 to 35 percent in the solum and 10 to 35 percent in the substratum. Reaction ranges from extremely acid to medium acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 to 4. It ranges from loamy sand to fine sandy loam or their gravelly analog.

The Bw1 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 7. It is sandy loam or gravelly sandy loam. The Bw2 and Bw3 horizons have hue of 10YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. They are loamy fine sand, loamy sand, loamy coarse sand, or their gravelly analog.

The Cd horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 2 to 4. It is loamy fine sand, loamy sand, loamy coarse sand, or their gravelly analog.

Freetown Series

Dysic, mesic Typic Medisaprists.

The Freetown series consists of very deep, very poorly drained organic soils on uplands. The soils formed in highly decomposed organic material in depressions and swales. Slopes are 0 to 1 percent.

Freetown soils are similar to Swansea soils and in many places are adjacent to Ridgebury and Whitman soils. The organic deposits in Freetown soils are thicker than those in Swansea soils. Ridgebury and Whitman soils formed in mineral material.

Typical pedon of Freetown muck, in a wooded area 500 feet northeast of the junction of Cedar Swamp Road and Peck Brothers Road, in the town of Monson.

Oa1—0 to 4 inches; black (5YR 2/1) sapric material; 10 percent fiber, 2 percent fiber rubbed; massive; very friable; 5 percent mineral; extremely acid; clear smooth boundary.

Oa2—4 to 14 inches; dark reddish brown (5YR 2/2) sapric material; 15 percent fiber, 3 percent fiber rubbed; massive; very friable; 5 percent mineral; extremely acid; clear smooth boundary.

Oa3—14 to 33 inches; dark reddish brown (5YR 2/2) sapric material; 10 percent fiber, 1 percent fiber rubbed; massive; very friable; 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa4—33 to 45 inches; dark brown (7.5YR 3/2) sapric material; 50 percent fiber, 1 percent fiber rubbed; massive; very friable; 5 percent mineral; faint stratification evident; extremely acid; clear smooth boundary.

Oa5—45 to 65 inches; dark reddish brown (5YR 2/2) sapric material; 10 percent fiber, 1 percent fiber rubbed; massive; very friable; 5 percent mineral; extremely acid.

The organic material extends to a depth of 51 inches or more. Some pedons contain woody fragments that comprise up to 25 percent of some horizons. Reaction is extremely acid throughout.

The surface tier has hue of 5YR to 10YR, value of 2 or 3, and chroma of 0 to 2. The subsurface and bottom tiers have hue of 5YR to 2.5Y, value of 2 to 4, and chroma of 0 to 3.

Gloucester Series

Sandy-skeletal, mixed, mesic Typic Dystrochrepts.

The Gloucester series consists of very deep, somewhat excessively drained soils in the uplands. These soils formed in loamy and sandy glacial till. Slopes range from 3 to 45 percent.

Gloucester soils are similar to Canton soils and in many places are adjacent to Scituate and Hollis soils. Gloucester soils have a thinner surface layer than Canton and Scituate soils and are deeper to bedrock than Hollis soils.

Typical pedon of Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony, 10 feet west of Butter Hill Road, 700 feet south of its junction with Enfield Road, in the town of Pelham.

A—0 to 5 inches; dark brown (10YR 4/3) gravelly fine sandy loam; weak fine granular structure; very friable; many fine and medium tree roots; 10 percent gravel, 5 percent cobbles, 5 percent stones; strongly acid; clear wavy boundary.

Bw1—5 to 15 inches; yellowish brown (10YR 5/6) gravelly sandy loam; weak medium subangular blocky structure; very friable; common fine and medium tree roots; 15 percent gravel, 5 percent cobbles, 5 percent stones; strongly acid; clear wavy boundary.

Bw2—15 to 29 inches; yellowish brown (10YR 5/4) very gravelly loamy sand; massive; very friable; few fine medium and coarse tree roots; 25 percent gravel, 10 percent cobbles, 5 percent stones; strongly acid; clear wavy boundary.

C—29 to 65 inches; light brownish gray (2.5Y 6/2) very gravelly loamy sand; single grain; loose; few fine medium and coarse tree roots; 35 percent gravel, 10 percent cobbles, 5 percent stones; moderately acid.

The solum thickness ranges from 20 to 35 inches. The content of rock fragments ranges from 5 to 35 percent in the surface layer, from 20 to 40 percent in the upper part of the B horizon, and from 35 to 60 percent in the lower part of the B horizon and in the C horizon. Reaction ranges from extremely acid to moderately acid.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. It is fine sandy loam, sandy loam, or their gravelly or very gravelly analog.

The Bw1 horizon has hue of 7.5Y or 10YR and value and chroma of 4 to 6. The Bw2 horizon has hue of 10YR or 2.5Y and value and chroma of 4 to 6. The Bw1 horizon is sandy loam, fine sandy loam, or their gravelly or very gravelly analog. The Bw2 horizon is loamy sand, loamy coarse sand, or their gravelly or very gravelly analog.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. The C horizon is gravelly or very gravelly coarse sand to loamy fine sand.

Hinckley Series

Sandy-skeletal, mixed, mesic Typic Udorthents.

The Hinckley series consists of very deep, excessively drained soils formed in water-sorted sand, gravel, and cobbles on glacial outwash plains, kames, and terraces. Slopes range from 0 to 35 percent.

Hinckley soils are similar to Merrimac soils and in many places are mapped adjacent to Sudbury and Windsor soils. Hinckley soils have less silt in the subsoil than Merrimac or Sudbury soils and more gravel than Windsor soils.

Typical pedon of Hinckley loamy sand, 15 to 25 percent slopes, in woods 40 feet north of Route 9, 1,400 feet east of its junction with Gulf Road, in the town of Belchertown.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; common fine and medium tree roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.

Bw—3 to 15 inches; yellowish brown (10YR 5/6) gravelly loamy sand; single grain; loose; few fine and medium tree roots; 25 percent gravel and 5 percent cobbles; strongly acid; gradual wavy boundary.

2C—15 to 65 inches; light yellowish brown (2.5Y 6/4) stratified very gravelly loamy sand, gravelly loamy sand, very gravelly sand, very gravelly coarse sand, gravelly sand, and gravelly coarse sand; single grain; loose; few fine and medium tree roots; 40 percent gravel; 10 percent cobbles; medium acid.

The solum thickness ranges from 12 to 30 inches. Gravel and cobbles range from 10 to 50 percent in the solum and 35 to 70 percent in the C horizon. Reaction ranges from extremely acid to moderately acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It ranges from loamy sand to very fine sandy loam or their gravelly or very gravelly analog.

The B horizon has hue of 7.5YR, 10YR, or 2.5Y; value of 4 or 5; and chroma of 4 to 8. It is loamy sand, loamy coarse sand, fine sandy loam, or their gravelly or very gravelly analog.

The C horizon has hue of 10YR to 2.5Y, value of 5 or 6, and chroma of 2 to 8. It ranges from gravelly loamy fine sand to very gravelly coarse sand.

Hollis Series

Loamy, mixed, mesic Lithic Dystrochrepts.

The Hollis series consists of shallow, somewhat excessively drained soils on uplands. The soils formed in glacial till. Slopes range from 3 to 45 percent.

Hollis soils are similar to Brimfield soils and in many areas are adjacent to Charlton and Gloucester soils. Hollis soils are yellower than Brimfield soils. Hollis soils have bedrock at a shallower depth than Charlton and Gloucester soils.

Typical pedon of Hollis fine sandy loam, in an area of Charlton-Hollis-Rock outcrop complex, sloping, 40 feet east of Route 202, 3,000 feet north of Knights Corner, in the town of Pelham.

A—0 to 2 inches; dark brown (10YR 4/3) fine sandy loam; weak to moderate medium granular structure; very friable; many fine tree roots; 5 percent gravel; very strongly acid; clear smooth boundary.

Bw1—2 to 9 inches; strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; many fine medium and coarse tree roots; 5 percent gravel; strongly acid; gradual smooth boundary.

Bw2—9 to 16 inches; strong brown (7.5YR 5/6) fine sandy loam; massive; very friable; many fine medium and coarse tree roots; 5 percent gravel; strongly acid; abrupt wavy boundary.

R—16 inches; bedrock.

The thickness of the solum and the depth to bedrock range from 10 to 20 inches. The content of rock fragments ranges from 5 to 25 percent. Reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is sandy loam, fine sandy loam, or their gravelly analog.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam, sandy loam, or their gravelly analog.

Some pedons have a thin C horizon.

Merrimac Series

Sandy, mixed, mesic Typic Dystrochrepts.

The Merrimac series consists of very deep, somewhat excessively drained soils on glacial outwash plains. The soils formed in glacial outwash deposits. Slopes range from 0 to 25 percent.

Merrimac soils are similar to Hinckley soils and in many places are adjacent to Sudbury and Walpole soils. Merrimac soils do not have the mottles that are typical of Sudbury and Walpole soils and have more silt in the solum than Hinckley soils.

Typical pedon of Merrimac sandy loam, 3 to 8 percent slopes, in woods 30 feet east of an access road

and 100 feet south of a power line south of Windsor Dam, in the town of Belchertown.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine and medium granular structure; very friable; many fine and medium tree roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.
Bw1—5 to 18 inches; brown (7.5YR 5/4) sandy loam; weak medium granular structure; very friable; common medium tree roots; 10 percent gravel; strongly acid; clear wavy boundary.
Bw2—18 to 26 inches; light yellowish brown (10YR 6/4) gravelly sandy loam; weak medium granular structure; very friable; common medium tree roots; 15 percent gravel; strongly acid; clear wavy boundary.
Bw3—26 to 29 inches; pale yellow (2.5Y 7/4) gravelly loamy sand; single grain; loose; few medium tree roots; 15 percent gravel and 5 percent cobblestones; medium acid; clear wavy boundary.
2C—29 to 65 inches; light gray (2.5Y 7/2) very gravelly sand (stratified sand and gravel); single grain; loose; 30 percent gravel; medium acid.

The solum thickness ranges from 18 to 30 inches. The content of rock fragments ranges from 5 to 20 percent in the upper part of the solum, 5 to 30 percent in the lower part, and 30 to 60 percent in the substratum. Reaction ranges from extremely acid to moderately acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or their gravelly analog.

The Bw1 and Bw2 horizons have hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 3 to 8. They are fine sandy loam, sandy loam, or their gravelly analog. The Bw3 horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 8. It is loamy coarse sand, loamy sand, or their gravelly analog.

The 2C horizon has hue of 10YR to 5Y and varies widely in value and chroma. It ranges from gravelly sand to very gravelly coarse sand.

Montauk Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts.

The Montauk series consists of very deep, well drained soils formed in glacial till, on uplands. Slopes range from 0 to 45 percent.

Montauk soils are similar to Essex soils and in many areas are adjacent to Scituate and Canton soils. Montauk soils have more silt in the solum than Essex soils and do not have the mottles that are typical of Scituate soils. Montauk soils have a hardpan; Canton soils do not.

Typical pedon of Montauk fine sandy loam, in an area of Montauk fine sandy loam, 8 to 15 percent slopes, very stony, in an orchard 200 feet east of Sabin Street, opposite its junction with Cordner Road, in the town of Belchertown.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common fine and medium roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.
Bw1—6 to 16 inches; strong brown (7.5YR 5/6) gravelly fine sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 15 percent gravel; very strongly acid; clear smooth boundary.
Bw2—16 to 24 inches; light olive brown (2.5Y 5/4) gravelly sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; 15 percent gravel; very strongly acid; abrupt smooth boundary.
2Cd—24 to 65 inches; gray (5Y 5/1) gravelly loamy coarse sand; weak thin to thick platy structure; very firm; 20 percent gravel; very strongly acid.

The solum is 18 to 30 inches thick and corresponds closely to the depth to the underlying coarse textured till. The content of rock fragments ranges from 5 to 20 percent in the solum and 10 to 30 percent in the substratum. Reaction ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is fine sandy loam, sandy loam, or their gravelly analog.

The upper part of the B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The lower part has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The B horizon is loam, fine sandy loam, sandy loam, or their gravelly analog.

The 2Cd horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3. It is loamy sand, loamy fine sand, loamy coarse sand, or their gravelly analog. It is firm or very firm.

Paxton Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts.

The Paxton series consists of very deep, well drained soils formed in glacial till on uplands. Slopes range from 3 to 45 percent.

Paxton soils are similar to Charlton soils and in many areas are adjacent to Woodbridge and Ridgebury soils. Paxton soils do not have the mottles that are typical of Woodbridge and Ridgebury soils. Paxton soils have a dense substratum; Charlton soils do not.

Typical pedon of Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony, in woods 600 feet west of East Greenwich Road, 5,500 feet north of its junction with Cummings Road, in the town of Ware.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; 10 percent gravel fragments; strongly acid; clear smooth boundary.

Bw1—8 to 16 inches; dark brown (7.5YR 4/4) gravelly fine sandy loam; weak fine subangular blocky structure; very friable; 15 percent gravel; strongly acid; clear wavy boundary.

Bw2—16 to 28 inches; dark brown (10YR 4/3) gravelly fine sandy loam; massive; friable; 15 percent gravel; strongly acid; clear smooth boundary.

C—28 to 32 inches; dark grayish brown (2.5Y 4/2) gravelly sandy loam; few fine distinct reddish yellow (7.5YR 6/6) mottles; massive; friable; 15 percent gravel; strongly acid; clear smooth boundary.

Cd—32 to 65 inches; dark grayish brown (2.5Y 4/2) gravelly fine sandy loam; massive; very firm; 15 percent gravel; moderately acid.

The thickness of the solum and the depth to the firm or very firm part of the substratum range from 20 to 38 inches. The content of rock fragments ranges from 5 to 35 percent in the solum and substratum. Reaction ranges from very strongly acid to moderately acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or their gravelly analog.

The Bw1 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The Bw2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The B horizon is fine sandy loam, sandy loam, or their gravelly analog.

Some pedons have a C horizon that is similar in color and texture to the Cd horizon and that is mottled in some areas.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. It is firm or very firm fine sandy loam, sandy loam, or their gravelly analog.

Pootatuck Series

Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts.

The Pootatuck series consists of very deep, moderately well drained soils on flood plains. The soils formed in alluvial material. Slopes range from 0 to 3 percent.

Pootatuck soils are similar to Rippowam soils and in many places are adjacent to Rippowam and Scarboro soils. Pootatuck soils have fewer mottles and are better drained than Rippowam and Scarboro soils.

Typical pedon of Pootatuck fine sandy loam, in a corn field 3,200 feet south of the Hardwick town line, 1,150 feet west of Route 32, in the town of Ware.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; moderately acid; abrupt smooth boundary.

A—9 to 12 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; massive; very friable; moderately acid; abrupt smooth boundary.

Bw—12 to 14 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; very friable; strongly acid; abrupt smooth boundary.

Ab1—14 to 24 inches; multiple layers of dark brown (10YR 4/3) and brown (10YR 5/3) fine sandy loam; common medium faint black (10YR 2/1) and very dark grayish brown (10YR 3/2) mottles; massive; very friable; very strongly acid; abrupt smooth boundary.

Ab2—24 to 32 inches; very dark grayish brown (10YR 3/2) sandy loam; common medium faint dark brown (10YR 4/3) mottles; massive; very friable; strongly acid; abrupt smooth boundary.

C—32 to 65 inches; yellowish brown (10YR 5/4) stratified coarse sand, sand, and fine sand; single grain; loose; strongly acid.

The solum thickness and depth to the coarse substratum range from 20 to 40 inches. Reaction ranges from very strongly acid to slightly acid.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is very fine sandy loam, fine sandy loam, or sandy loam.

The B horizon has hue of 10YR to 5Y and value and chroma of 3 to 6. It is fine sandy loam or sandy loam. Low-chroma mottles are at a depth of less than 24 inches.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It ranges mainly from loamy fine sand to coarse sand. Thin strata of sandy loam, silt loam, or gravel are in some pedons.

Ridgebury Series

Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts.

The Ridgebury series consists of very deep, poorly drained and somewhat poorly drained soils formed in glacial till on uplands. Slopes range from 0 to 8 percent.

Ridgebury soils are similar to Whitman soils and in many areas are adjacent to Woodbridge and Scituate soils. Ridgebury soils have a thinner, lighter colored surface layer than Whitman soils and are grayer in the upper part of the subsoil than Woodbridge and Scituate soils.

Typical pedon of Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony, in woods 1,600 feet east of Route 202, 3,950 feet south of its junction with Amherst Road, in the town of Pelham.

A—0 to 5 inches; black (N 2/0) fine sandy loam; weak medium and coarse granular structure; friable; many very fine, fine, and medium tree roots; 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt smooth boundary.

Bw1—5 to 9 inches; dark brown (10YR 4/3) sandy loam; weak medium subangular blocky structure; friable; few fine tree roots; 5 percent gravel and 5 percent cobbles; very strongly acid; abrupt wavy boundary.

Bw2—9 to 18 inches; dark gray (10YR 4/1) gravelly sandy loam; common fine distinct yellowish brown (10YR 5/6) and common medium distinct reddish brown (5YR 4/4) mottles; massive; friable; 10 percent gravel and 5 percent cobbles; very strongly acid; gradual wavy boundary.

Cd—18 to 65 inches; gray (5Y 5/1) gravelly sandy loam; common fine prominent reddish yellow (7.5YR 6/8) mottles; massive; firm; 10 percent gravel and 5 percent cobbles; very strongly acid.

The solum thickness and the depth to the dense substratum range from 14 to 25 inches. The content of rock fragments ranges from 5 to 35 percent in the solum and substratum. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2 or is neutral. The A horizon is fine sandy loam, sandy loam, or their gravelly analog.

The B horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 3 or is neutral. It ranges from sandy loam to loam and their gravelly analog.

The Cd horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 to 4. It is firm or very firm coarse sandy loam to loam and includes their gravelly analog.

Rippowam Series

Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents.

The Rippowam series consists of very deep, poorly drained soils on flood plains. The soils formed in alluvial material. Slopes range from 0 to 3 percent.

Rippowam soils are similar to Pootatuck soils and in many places are adjacent to Pootatuck and Scarboro soils. Rippowam soils are grayer than Pootatuck soils and have a lighter-colored surface layer than Scarboro soils.

Typical pedon of Rippowam fine sandy loam, in an abandoned field 1,000 feet north of the Monson State Hospital Power Plant, in the town of Monson.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

C1—7 to 12 inches; very dark gray (10YR 3/1) fine sandy loam; many medium prominent red (2.5YR 5/8) and dark yellowish brown (10YR 3/4) mottles; massive; very friable; very strongly acid; clear wavy boundary.

C2—12 to 17 inches; very dark gray (10YR 3/1) fine sandy loam; many fine prominent red (2.5YR 5/8), dark yellowish brown (10YR 3/4), and pinkish gray (5YR 6/2) mottles; massive; very friable; strongly acid; clear wavy boundary.

C3—17 to 22 inches; very dark grayish brown (10YR 3/2) sandy loam; many fine prominent red (2.5YR 5/8), dark yellowish brown (10YR 3/4), and pinkish gray (5YR 6/2) mottles; massive; very friable; medium acid; clear wavy boundary.

C4—22 to 28 inches; very dark gray (10YR 3/1) loamy sand; massive; very friable; medium acid; clear wavy boundary.

C5—28 to 65 inches; very dark gray (10YR 3/1) stratified loamy sand, sand, coarse sand, gravelly sand, and gravelly loamy sand; loose; single grain; medium acid.

The depth to the coarse textured part of the substratum ranges from 20 to 40 inches thick. Gravel content ranges from 0 to 10 percent in the surface layer and upper part of the C horizon, and from 0 to 20 percent in the coarse textured part of the C horizon. Reaction is very strongly acid to slightly acid.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam or sandy loam.

The C horizon has hue of 10YR to 5Y, value of 3 to 6, and chroma of 1 or 2. The upper part of the C

horizon is fine sandy loam or sandy loam. The lower part, below a depth of 20 to 40 inches, ranges from loamy fine sand to coarse sand and their gravelly analog.

Scarboro Series

Sandy, mixed, mesic Histic Humaquepts.

The Scarboro series consists of very deep, very poorly drained soils on outwash plains and terraces. The soils formed in sandy glacial outwash deposits. Slopes range from 0 to 3 percent.

Scarboro soils are similar to Walpole soils and are commonly mapped adjacent to Rippowam soils. Scarboro soils are grayer than Walpole soils and have a layer of muck at the surface which is not characteristic of Rippowam soils.

Typical pedon of Scarboro mucky fine sandy loam, in woods 1,600 feet west of the entrance to the sanitary landfill off Hamilton Street, in the town of Belchertown.

Oa—5 inches to 0; black (10YR 2/1) muck; weak medium granular structure; very friable; many fine and very fine roots; moderately acid; clear smooth boundary.

A—0 to 10 inches; black (5YR 2/1) mucky fine sandy loam; weak medium granular structure; friable; moderately acid; abrupt smooth boundary.

Cg1—10 to 16 inches; gray (10YR 5/1) loamy sand; single grain; loose; 5 percent rock fragments; slightly acid; abrupt smooth boundary.

Cg2—16 to 65 inches; grayish brown (2.5Y 5/2) and olive gray (5Y 4/2) stratified sand and gravel; slightly acid; few coarse distinct yellowish brown (10YR 5/6) mottles in upper 8 inches; single grain; loose; slightly acid.

The content of rock fragments ranges from 0 to 10 percent in the A horizon and 0 to 50 percent in the C horizon. Reaction is very strongly acid or medium acid in the A horizon and very strongly acid to slightly acid in the C horizon.

The O horizon is muck or mucky peat.

The A horizon has hue of 7.5YR to 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral. It is loamy fine sand, loamy sand, fine sandy loam, or sandy loam.

The C horizon has hue of 7.5YR to 5Y, value of 2 to 6, and chroma of 1 to 4 or is neutral. The number of mottles ranges from none to many. The C horizon ranges from loamy fine sand to coarse sand and their gravelly or very gravelly analog.

Scituate Series

Coarse-loamy, mixed, mesic Typic Dystrochrepts.

The Scituate series consists of very deep, moderately well drained soils on uplands. The soils formed in glacial till. Slopes range from 3 to 25 percent.

Scituate soils are similar to Montauk soils and in many places are adjacent to Essex and Ridgebury soils. Scituate soils have mottles that Montauk and Essex soils do not have. Scituate soils have browner hues than Ridgebury soils.

Typical pedon of Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony, in woods 50 feet west of Shutesbury Road, 3,600 feet northwest of its junction with Daniel Shays Highway, in the town of Pelham.

A—0 to 5 inches; black (10YR 2/1) fine sandy loam, dark gray (10YR 4/1) dry; weak and moderate fine granular structure; very friable; many fine tree roots; 10 percent gravel; extremely acid; abrupt wavy boundary.

Bw1—5 to 21 inches; strong brown (7.5YR 5/6) fine sandy loam; massive; very friable; common fine and medium tree roots; 10 percent gravel; strongly acid; clear wavy boundary.

Bw2—21 to 27 inches; yellowish brown (10YR 5/6) sandy loam; common fine and medium distinct yellowish red (5YR 5/6) mottles; massive; very friable; few fine and medium tree roots; 10 percent gravel; strongly acid; clear wavy boundary.

2Cd—27 to 65 inches; yellowish brown (10YR 5/4) very gravelly loamy sand; common medium distinct light brownish gray (2.5Y 6/2) mottles; massive; firm; 30 percent gravel; 5 percent cobbles; moderately acid.

The solum thickness and depth to the substratum range from 18 to 34 inches. The content of rock fragments ranges from 5 to 30 percent above the substratum and from 10 to 50 percent in the substratum. Reaction ranges from moderately acid to extremely acid in unlimed areas.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam, loam, sandy loam, or their gravelly analog.

The B horizon has hue of 7.5YR or 10YR in the upper part and 10YR or 2.5Y in the lower part. The B horizon has value of 3 to 6 and chroma of 4 to 6. It is fine sandy loam, loam, sandy loam, or their gravelly analog.

The 2Cd horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It has common or many mottles. It is loamy sand, loamy fine sand, loamy coarse

sand, or their gravelly analog. Consistence is firm or very firm.

Sudbury Series

Sandy, mixed, mesic Aquic Dystrochrepts.

The Sudbury series consists of very deep, moderately well drained soils on outwash plains and terraces. The soils formed in glacial outwash deposits. Slopes range from 0 to 8 percent.

Sudbury soils are similar to Merrimac soils and in many places are adjacent to Walpole and Hinckley soils. Sudbury soils have mottles, and Merrimac and Hinckley soils do not. Sudbury soils do not have mottles in the upper part of the subsoil, which is typical of Walpole soils.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in a pasture east of Mill Valley Road, 1,000 feet south of its junction with Cold Springs Road, in the town of Belchertown.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak and moderate fine granular structure; very friable; many fine roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.

Bw1—10 to 17 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; very friable; many fine roots; 10 percent gravel; strongly acid; clear smooth boundary.

Bw2—17 to 23 inches; yellowish brown (10YR 5/4) loamy sand; common medium faint brown to dark brown (7.5YR 4/4) mottles; weak fine granular structure; very friable; few fine roots; 10 percent gravel; strongly acid; abrupt smooth boundary.

2C—23 to 65 inches; light brownish gray (10YR 6/2) sand and gravel; common medium distinct brown to dark brown (7.5YR 4/4) mottles; single grain; loose; 40 percent gravel; 30 percent cobbles in individual strata; strongly acid.

The solum thickness and the depth to stratified sand and gravel range from 18 to 30 inches. The solum is 5 to 25 percent coarse fragments, and the substratum is 30 to 70 percent coarse fragments. Reaction ranges from extremely acid to moderately acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is fine sandy loam, sandy loam, very fine sandy loam, or their gravelly analog.

The B horizon has hue of 7.5YR or 10YR and value and chroma of 3 to 5. It is fine sandy loam or sandy loam in the upper part and ranges from sandy loam to coarse sand in the lower part.

The 2C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 2 to 8. It ranges from loamy sand to very gravelly sand and is stratified.

Swansea Series

Sandy or sandy-skeletal, mixed, dysic, mesic Terric Medisaprists.

The Swansea series consists of very deep, very poorly drained, organic soils on uplands and on outwash plains. The soils formed in 16 to 51 inches of highly decomposed organic material over sandy mineral material. Slopes are 0 to 1 percent.

Swansea soils are similar to Freetown soils and in many places are adjacent to Walpole and Scarboro soils. Swansea soils have thinner organic deposits than Freetown soils. Walpole and Scarboro soils formed in mineral material.

Typical pedon of Swansea muck, in a wooded area 800 feet north of Paradise Lake Road, 3,300 feet west of its junction with Ely Road, in the town of Monson.

Oa1—0 to 8 inches; black (10YR 2/1) sapric material; 5 percent fiber, 2 percent rubbed; massive; very friable; common coarse roots; 10 percent mineral; extremely acid; clear smooth boundary.

Oa2—8 to 16 inches; black (N 2/0) sapric material; 5 percent fiber, 2 percent rubbed; massive; very friable; common coarse roots; 25 percent mineral; extremely acid; abrupt smooth boundary.

Oa3—16 to 48 inches; stratified very dark brown (7.5YR 2/2) and very dark grayish brown (10YR 3/2) sapric material and mucky fine sandy loam; 5 percent fiber, 2 percent rubbed; massive; very friable; few fine roots in upper part; 25 percent mineral; extremely acid; clear smooth boundary.

2C—48 to 65 inches; gray (5Y 5/1) loamy fine sand; massive; very friable; extremely acid.

The depth to the 2C horizon ranges from 16 to 51 inches. Woody fragments comprise up to 25 percent of some pedons. Reaction is extremely acid in the organic material and ranges from extremely acid to strongly acid in the 2C horizon.

The organic matter has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral. It is dominantly sapric material.

The 2C horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 1 to 3. It is mottled in some pedons. It ranges from coarse sand to loamy fine sand and their gravelly or very gravelly analog. Gravel content ranges from 0 to 40 percent.

Walpole Series

Sandy, mixed, mesic Aeric Haplaquepts.

The Walpole series consists of very deep, poorly drained soils on outwash plains and terraces. The soils formed in sandy glacial outwash deposits. Slopes range from 0 to 3 percent.

Walpole soils are similar to Sudbury soils and in many places are adjacent to Merrimac and Scarboro soils. Walpole soils have mottles in the upper part of the subsoil; Sudbury and Merrimac soils do not. Walpole soils are not as gray in the upper part of the subsoil as Scarboro soils.

Typical pedon of Walpole fine sandy loam, in woods 700 feet south of Goodell Road, 2,700 feet east of its junction with Wright Street, in the town of Belchertown.

A—0 to 3 inches; very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; very strongly acid; clear wavy boundary.

Bw1—3 to 15 inches; dark brown (10YR 4/3) fine sandy loam; common fine distinct reddish brown (5YR 4/3) mottles, common fine distinct yellowish red (5YR 4/6) mottles, and few medium faint dark brown (7.5YR 4/2) mottles; weak fine subangular blocky structure; very friable; strongly acid; clear wavy boundary.

Bw2—15 to 23 inches; grayish brown (10YR 5/2) sandy loam; common fine distinct reddish gray (5YR 5/2) mottles, common fine distinct yellowish red (5YR 4/6) mottles, and few medium faint dark brown (7.5YR 4/2) mottles; massive; very friable; strongly acid; clear wavy boundary.

2C1—23 to 29 inches; grayish brown (2.5Y 5/2) loamy sand; massive; very friable; strongly acid; clear wavy boundary.

2C2—29 to 65 inches; grayish brown (2.5Y 5/2) stratified loamy sand, sand, coarse sand, and gravelly coarse sand; loose; 10 percent gravel; single grain; moderately acid.

The solum thickness and the depth to the coarse textured part of the substratum range from 18 to 28 inches. The content of rock fragments ranges from 0 to 10 percent in the solum and 0 to 30 percent in the substratum. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam or sandy loam.

The B horizon has hue of 10YR to 2.5Y, value of 4 to 6, and chroma of 1 to 3. It is fine sandy loam or sandy loam.

The 2C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. It ranges from coarse sand to loamy fine sand and their gravelly analog. It typically is stratified in the lower part.

Whitman Series

Coarse-loamy, mixed, nonacid, mesic Typic Humaquepts.

The Whitman series consists of very deep, very poorly drained soils on uplands. The soils formed in glacial till. Slopes range from 0 to 3 percent.

Whitman soils are similar to Ridgebury soils and in many places are adjacent to Woodbridge and Charlton soils. Whitman soils are grayer and more poorly drained than those soils.

Typical pedon of Whitman fine sandy loam, extremely stony, 550 feet west of Old Warren Road, 2,000 feet south of its junction with Prendville Road, in the town of Ware.

A—0 to 8 inches; black (10YR 2/1) fine sandy loam; weak fine granular structure; very friable; many fine and medium tree roots; 10 percent gravel; very strongly acid; abrupt smooth boundary.

Bg1—8 to 16 inches; gray (5Y 6/1) fine sandy loam; common fine distinct brown (7.5YR 5/4) mottles; massive; friable; 10 percent gravel; very strongly acid; clear smooth boundary.

Bg2—16 to 20 inches; gray (5Y 6/1) gravelly sandy loam; common fine distinct brown (7.5YR 5/4) and reddish yellow (5YR 6/6) mottles; massive; friable; 20 percent gravel; very strongly acid; clear smooth boundary.

Cdg—20 to 65 inches; gray (5Y 6/1) sandy loam; few fine distinct brown (7.5YR 5/4) mottles; massive; firm to very firm; 10 percent gravel; very strongly acid.

The thickness of the solum and the depth to the substratum range from 12 to 30 inches. The content of rock fragments ranges from 5 to 25 percent in the solum and substratum. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral. It is fine sandy loam, sandy loam, or their gravelly analog.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2. It has few or common mottles. It is sandy loam, fine sandy loam, loam, or their gravelly analog.

The Cdg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2 or is neutral. It is sandy loam, fine sandy loam, or their gravelly analog.

Windsor Series

Mixed, mesic Typic Udipsamments.

The Windsor series consists of very deep, excessively drained soils on outwash plains and terraces. The soils formed in sandy glacial outwash. Slopes range from 0 to 25 percent.

Windsor soils are similar to Deerfield soils and in many places are adjacent to Hinckley and Sudbury soils. Windsor soils do not have the mottles that are typical of Deerfield and Sudbury soils. Windsor soils have less gravel than Hinckley soils.

Typical pedon of Windsor loamy sand, 3 to 8 percent slopes, north of railroad tracks 100 feet west of Warren Wright Road, in the town of Belchertown.

Ap—0 to 9 inches; dark brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine and very fine roots; very strongly acid; abrupt smooth boundary.

Bw1—9 to 18 inches; yellowish brown (10YR 5/6) loamy sand; massive; very friable; few very fine, fine, and medium roots; strongly acid; clear smooth boundary.

Bw2—18 to 28 inches; pale brown (10YR 6/3) sand; single grain; loose; few coarse and very coarse roots; 5 percent gravel; strongly acid; clear smooth boundary.

C—28 to 65 inches; light gray (2.5Y 7/2) sand; single grain; loose; strongly acid.

The solum thickness ranges from 20 to 30 inches. Gravel content mainly ranges from 0 to 10 percent in the solum and 0 to 15 percent in the substratum. It is as much as 35 percent in individual thin strata. Reaction is very strongly acid or strongly acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. It is loamy sand or loamy fine sand.

The Bw1 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is loamy sand or loamy fine sand. The Bw2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is loamy sand or sand.

The C horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 to 6. It is sand, fine sand, or their gravelly analog.

Woodbridge Series

Coarse-loamy, mixed, mesic Aquic Dystrochrepts.

The Woodbridge series consists of very deep, moderately well drained soils formed in glacial till on uplands. Slopes range from 0 to 25 percent.

Woodbridge soils are similar to Paxton soils and in many places are adjacent to Ridgebury and Charlton soils. Woodbridge soils have mottles; Paxton and Charlton soils do not. Woodbridge soils are browner in the subsoil than Ridgebury soils.

Typical pedon of Woodbridge fine sandy loam, in an area of Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony, 150 feet west of East Greenwich Road, 5,550 feet north of its junction with Cummings Road, in the town of Ware.

A—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium tree roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bw1—9 to 15 inches; dark brown (7.5YR 4/4) fine sandy loam; massive; very friable; common fine and medium tree roots; 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bw2—15 to 24 inches; dark brown (10YR 4/3) sandy loam; common medium distinct reddish yellow (7.5YR 6/6) and pinkish gray (5YR 6/2) mottles; massive; very friable; 10 percent coarse fragments; strongly acid; clear smooth boundary.

C—24 to 28 inches; grayish brown (2.5Y 5/2) sandy loam; massive common medium distinct reddish yellow (7.5YR 6/6) mottles; massive; friable; 10 percent coarse fragments; strongly acid; clear smooth boundary.

Cd—28 to 65 inches; grayish brown (2.5Y 5/2) fine sandy loam; weak thin and medium plates; very firm; 10 percent coarse fragments; strongly acid.

The solum is 18 to 36 inches thick. The content of rock fragments ranges from 5 to 30 percent. Reaction ranges from strongly acid to medium acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is fine sandy loam or sandy loam.

The upper part of the B horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 to 6. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 6. The B horizon is fine sandy loam, sandy loam, or loam and is gravelly in some pedons.

The Cd horizon has hue of 2.5Y or 5Y, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam, sandy loam, or loam and is gravelly in some pedons.

Formation of the Soils

The major factors of soil formation are parent material, climate, topography, time, and living organisms. In this survey area, parent material and topography are the primary factors.

The parent material in this survey area consists of glacial till and glacial outwash derived from crystalline rocks, geologically recent alluvial deposits, and, in wet areas, thick deposits of decomposed organic matter. Glacial till consists of unstratified, unsorted clay, silt, sand, and boulders that were moved and deposited by a glacier. The consistence of the till ranges from friable to very firm. The glacial outwash consists of sorted, stratified gravel, sand, and silt that were deposited by glacial meltwaters. The recent materials deposited by stream overflow are on flood plains of streams and consist of gravel, sand, silt, or clay or various combinations of these.

Topography, specifically the position and relief of the landform on which the soil develops, causes differences in soils formed in parent material of the same age and composition. Generally, soils formed on steep slopes will have a thinner solum than soils on level or nearly level slopes. The position of the soil on the landscape and the relationship to the water table will further influence formation. Soils on lower positions generally are wetter and slower to warm up in the spring.

Climate affects the chemical and physical reactions that regulate soil formation. Rainfall provides water for plants and animals that add organic matter to the soil, dissolves soluble elements, and leaches soluble elements to other parts of the soil. Frost action breaks apart soil and rock fragments. Changes in temperature affect the rate of chemical and physical reactions.

Plant roots physically and chemically promote soil aggregation, and when the plants die they add organic matter to the soil. Small animals and insects are continually digging and churning the soil. Man, while establishing farms, homesites, and industrial areas, has in many cases significantly altered the shape and nature of many landforms, thereby altering the nature of soils formed on and near these landforms.

Most of the soils in this survey area are of the same age, except for soils formed in recent deposits on flood plains and thick organic deposits. All soil materials that were on the landscape before glaciation were remixed, reworked, and redeposited during the period of glaciation which ended about 16,000 years ago.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20

inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when it is dry and plastic or stiff when it is wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form

a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils

are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers

especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the

soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of

soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile.

Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in

diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has

properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest and during preparation of a seedbed for the next crop and the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related

to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Data recorded in the period 1951-81 at Amherst, Massachusetts)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	33.1	13.0	23.1	56	-18	13	3.09	1.24	4.63	6	11.8
February----	36.2	15.5	25.9	57	-13	14	2.83	1.73	3.81	6	11.3
March-------	45.1	25.3	35.2	70	2	40	3.52	1.90	4.93	7	9.1
April-------	58.9	34.9	46.9	84	18	225	3.64	2.45	4.72	7	1.4
May---------	70.5	44.7	57.6	90	28	546	3.39	2.05	4.59	8	.0
June--------	78.9	54.5	66.7	94	37	801	3.78	2.16	5.22	7	.0
July--------	83.3	59.4	71.4	96	43	973	3.72	2.01	5.22	6	.0
August------	81.4	57.1	69.3	93	40	908	4.01	1.86	5.85	6	.0
September---	73.9	49.4	61.7	91	29	651	3.64	1.86	5.18	6	.0
October-----	63.4	39.0	51.2	82	19	352	3.35	1.63	4.83	6	.0
November----	50.2	31.1	40.7	71	13	97	3.54	2.09	4.83	7	2.0
December----	36.9	18.9	27.9	62	-11	19	3.86	2.21	5.31	7	11.4
Yearly:											
Average---	59.3	36.9	48.1	---	---	---	---	---	---	---	---
Extreme---	---	---	---	96	-21	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,639	42.37	35.07	49.32	79	47.0

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Data recorded in the period 1951-81 at Amherst, Massachusetts)

Probability	Temperature		
	24^{o} F or lower	28^{o} F or lower	32^{o} F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 26	May 11	May 28
2 years in 10 later than--	Apr. 20	May 5	May 22
5 years in 10 later than--	Apr. 9	Apr. 23	May 10
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 13	Sept. 27	Sept. 16
2 years in 10 earlier than--	Oct. 18	Oct. 2	Sept. 21
5 years in 10 earlier than--	Oct. 28	Oct. 12	Sept. 30

TABLE 3.--GROWING SEASON

(Data recorded in the period 1951-81 at Amherst, Massachusetts)

Probability	Daily minimum temperature during growing season		
	Higher than 24^{o} F	Higher than 28^{o} F	Higher than 32^{o} F
	Days	Days	Days
9 years in 10	179	148	116
8 years in 10	187	156	125
5 years in 10	202	172	142
2 years in 10	217	188	159
1 year in 10	225	196	168

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Hampden County	Hampshire County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
BoB	Brookfield fine sandy loam, 3 to 8 percent slopes, extremely stony	200	0	200	0.1
BoC	Brookfield fine sandy loam, 8 to 15 percent slopes, extremely stony	675	0	675	0.5
BoD	Brookfield fine sandy loam, 15 to 25 percent slopes, extremely stony	265	5	270	0.2
BrC	Brookfield-Brimfield-Rock outcrop complex, strongly sloping	3,550	70	3,620	2.5
BrE	Brookfield-Brimfield-Rock outcrop complex, steep	7,910	700	8,610	6.2
CaB	Canton fine sandy loam, 3 to 8 percent slopes, very stony	45	1,105	1,150	0.9
CaC	Canton fine sandy loam, 8 to 15 percent slopes, very stony	20	625	645	0.4
CcB	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony	440	1,695	2,135	1.5
CcC	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	715	3,185	3,900	2.9
CcD	Canton fine sandy loam, 15 to 25 percent slopes, extremely stony	450	3,090	3,540	2.5
CmB	Charlton fine sandy loam, 3 to 8 percent slopes, very stony	195	80	275	0.2
CnB	Charlton fine sandy loam, 3 to 8 percent slopes, extremely stony	105	185	290	0.2
CnC	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony	170	620	790	0.5
CnD	Charlton fine sandy loam, 15 to 25 percent slopes, extremely stony	190	350	540	0.4
CrC	Charlton-Hollis-Rock outcrop complex, strongly sloping	1,740	2,570	4,310	3.0
CrE	Charlton-Hollis-Rock outcrop complex, steep	4,305	6,905	11,210	8.0
De	Deerfield loamy fine sand	250	100	350	0.2
Du	Dumps, landfill	5	50	55	*
EeB	Essex gravelly fine sandy loam, 3 to 8 percent slopes	115	230	345	0.2
EsB	Essex gravelly fine sandy loam, 3 to 8 percent slopes, very stony	455	445	900	0.7
EsC	Essex gravelly fine sandy loam, 8 to 15 percent slopes, very stony	380	275	655	0.4
ExB	Essex gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony	505	215	720	0.6
ExC	Essex gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony	520	165	685	0.6
ExD	Essex gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony	500	145	645	0.4
Fm	Freetown muck	2,265	1,440	3,705	2.6
GfB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes	35	220	255	0.2
GhB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, very stony	180	485	665	0.6
GhC	Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, very stony	170	380	550	0.4
GxB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony	240	1,215	1,455	1.1
GxC	Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony	710	2,060	2,770	2.0
GxD	Gloucester gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony	370	1,405	1,775	1.3
GyE	Gloucester and Canton soils, steep, extremely stony	1,635	2,115	3,750	2.6
HgA	Hinckley loamy sand, 0 to 3 percent slopes	100	760	860	0.7
HgB	Hinckley loamy sand, 3 to 8 percent slopes	1,455	3,885	5,340	3.8
HgC	Hinckley loamy sand, 8 to 15 percent slopes	2,090	3,015	5,105	3.5
HgD	Hinckley loamy sand, 15 to 25 percent slopes	820	2,460	3,280	2.3
HgE	Hinckley loamy sand, 25 to 35 percent slopes	965	850	1,815	1.3
MeA	Merrimac sandy loam, 0 to 3 percent slopes	215	270	485	0.4
MeB	Merrimac sandy loam, 3 to 8 percent slopes	685	1,070	1,755	1.3
MeC	Merrimac sandy loam, 8 to 15 percent slopes	300	375	675	0.5
MoB	Montauk fine sandy loam, 3 to 8 percent slopes	90	175	265	0.2
MsB	Montauk fine sandy loam, 3 to 8 percent slopes, very stony	305	665	970	0.8
MsC	Montauk fine sandy loam, 8 to 15 percent slopes, very stony	120	730	850	0.6

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Hampden County	Hampshire County	Total-- Area	Total-- Extent
		Acres	Acres	Acres	Pct
MsD	Montauk fine sandy loam, 15 to 25 percent slopes, very stony	30	170	200	0.1
MxB	Montauk fine sandy loam, 3 to 8 percent slopes, extremely stony	625	710	1,335	1.0
MxC	Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony	565	820	1,385	1.0
MxD	Montauk fine sandy loam, 15 to 25 percent slopes, extremely stony	410	340	750	0.6
PaB	Paxton fine sandy loam, 3 to 8 percent slopes	225	115	340	0.2
PaC	Paxton fine sandy loam, 8 to 15 percent slopes	365	50	415	0.3
PbB	Paxton fine sandy loam, 3 to 8 percent slopes, very stony	150	100	250	0.2
PbC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	340	165	505	0.3
PcB	Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony	680	305	985	0.6
PcC	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	2,910	715	3,625	2.6
PcD	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	2,405	550	2,955	2.1
PeE	Paxton and Montauk fine sandy loams, steep, extremely stony	2,190	320	2,510	1.8
Pg	Pits, gravel	325	160	485	0.3
Pv	Pootatuck fine sandy loam	55	370	425	0.3
RdB	Ridgebury fine sandy loam, 0 to 6 percent slopes	150	230	380	0.3
ReA	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	730	1,480	2,210	1.6
ReB	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	4,185	2,565	6,750	4.9
Rm	Rippowam fine sandy loam	310	70	380	0.3
Sb	Scarboro-Rippowam complex	180	615	795	0.5
SgB	Scituate fine sandy loam, 3 to 8 percent slopes	430	835	1,265	1.0
SgC	Scituate fine sandy loam, 8 to 15 percent slopes	245	100	345	0.2
ShB	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	1,010	1,265	2,275	1.6
ShC	Scituate fine sandy loam, 8 to 15 percent slopes, very stony	195	170	365	0.2
StB	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	1,960	4,255	6,215	4.4
StC	Scituate fine sandy loam, 8 to 15 percent slopes, extremely stony	1,675	2,345	4,020	2.8
StD	Scituate fine sandy loam, 15 to 25 percent slopes, extremely stony	275	240	515	0.3
SuA	Sudbury fine sandy loam, 0 to 3 percent slopes	685	495	1,180	0.9
SuB	Sudbury fine sandy loam, 3 to 8 percent slopes	220	360	580	0.4
Sw	Swansea muck	1,010	750	1,760	1.3
Wa	Walpole fine sandy loam	1,115	670	1,785	1.3
Wh	Whitman fine sandy loam, extremely stony	510	810	1,320	1.0
WnB	Windsor loamy sand, 3 to 8 percent slopes	700	465	1,165	0.9
WnC	Windsor loamy sand, 8 to 15 percent slopes	410	290	700	0.5
WnD	Windsor loamy sand, 15 to 25 percent slopes	190	100	290	0.2
WsB	Woodbridge fine sandy loam, 3 to 8 percent slopes, very stony	305	120	425	0.3
WtB	Woodbridge fine sandy loam, 3 to 8 percent slopes, extremely stony	2,290	545	2,835	2.0
WtC	Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony	1,415	460	1,875	1.4
WtD	Woodbridge fine sandy loam, 15 to 25 percent slopes, extremely stony	210	40	250	0.2
	Water	400	790	1,190	0.8
	Total	68,535	71,340	139,875	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland.

Map symbol	Soil name
MeA	Merrimac sandy loam, 0 to 3 percent slopes
MeB	Merrimac sandy loam, 3 to 8 percent slopes
MoB	Montauk fine sandy loam, 3 to 8 percent slopes
PaB	Paxton fine sandy loam, 3 to 8 percent slopes
Pv	Pootatuck fine sandy loam
SgB	Scituate fine sandy loam, 3 to 8 percent slopes
SuA	Sudbury fine sandy loam, 0 to 3 percent slopes
SuB	Sudbury fine sandy loam, 3 to 8 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn silage	Sweet corn	Alfalfa hay	Grass-legume hay	Grass-clover
		Tons	Tons	Tons	Tons	AUM*
BoB, BoC, BoD: Brookfield	VIIs	---	---	---	---	---
BrC**: Brookfield-Brimfield-Rock outcrop	VIIs	---	---	---	---	---
BrE**: Brookfield-Brimfield-Rock outcrop	VIIs	---	---	---	---	---
CaB, CaC: Canton	VIs	---	---	---	---	---
CcB, CcC, CcD: Canton	VIIs	---	---	---	---	---
CmB: Charlton	VIs	---	---	---	---	---
CnB, CnC, CnD: Charlton	VIIs	---	---	---	---	---
CrC**: Charlton-Hollis-Rock outcrop	VIIs	---	---	---	---	---
CrE**: Charlton-Hollis-Rock outcrop	VIIs	---	---	---	---	---
De: Deerfield	IIIw	16	6.0	3.5	3.0	5.8
Du**. Dumps						
EeB: Essex	IIe	16	---	4.0	3.0	5.7
EsB, EsC: Essex	VIs	---	---	---	---	---
ExB, ExC, ExD: Essex	VIIs	---	---	---	---	---
Fm: Freetown	Vw	---	---	---	---	---
GfB: Gloucester	IIs	16	---	4.0	3.0	5.7
GhB, GhC: Gloucester	VIs	---	---	---	---	---
GxB, GxC, GxD: Gloucester	VIIs	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Sweet corn	Alfalfa hay	Grass-legume hay	Grass-clover
		Tons	Tons	Tons	Tons	AUM*
GyE----------------------- Gloucester and Canton	VIIs	---	---	---	---	---
HgA, HgB------------------ Hinckley	IIIs	12	4.5	2.5	2.0	3.6
HgC----------------------- Hinckley	IVs	---	---	---	---	2.5
HgD----------------------- Hinckley	VIs	---	---	---	---	2.0
HgE----------------------- Hinckley	VIIs	---	---	---	---	---
MeA, MeB------------------ Merrimac	IIs	18	6.1	4.0	3.0	5.7
MeC----------------------- Merrimac	IIIe	16	6.0	4.0	3.0	5.7
MoB----------------------- Montauk	IIe	22	---	4.0	3.5	6.5
MsB, MsC, MsD------------- Montauk	VIs	---	---	---	---	---
MxB, MxC, MxD------------- Montauk	VIIs	---	---	---	---	---
PaB----------------------- Paxton	IIe	24	5.9	4.5	4.0	7.5
PaC----------------------- Paxton	IIIe	22	---	4.5	4.0	7.5
PbB, PbC------------------ Paxton	VIs	---	---	---	---	---
PcB, PcC, PcD------------- Paxton	VIIs	---	---	---	---	---
PeE----------------------- Paxton and Montauk	VIIs	---	---	---	---	---
Pg**. Pits						
Pv------------------------ Pootatuck	IIw	24	6.3	4.0	4.5	7.5
RdB----------------------- Ridgebury	IIIw	16	6.0	3.5	3.5	7.6
ReA, ReB------------------ Ridgebury	VIIs	---	---	---	---	---
Rm------------------------ Rippowam	IVw	---	---	---	3.0	3.5

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn silage	Sweet corn	Alfalfa hay	Grass-legume hay	Grass-clover
		Tons	Tons	Tons	Tons	AUM*
Sb----------------------- Scarboro-Rippowam	Vw	---	---	---	---	---
SgB---------------------- Scituate	IIw	24	---	4.0	3.5	6.5
SgC---------------------- Scituate	IIIe	22	---	4.0	3.5	6.5
ShB, ShC----------------- Scituate	VIs	---	---	---	---	---
StB, StC, StD------------ Scituate	VIIs	---	---	---	---	---
SuA---------------------- Sudbury	IIw	18	5.9	3.5	4.0	7.5
SuB---------------------- Sudbury	IIe	18	5.9	3.5	4.0	7.5
Sw----------------------- Swansea	Vw	---	---	---	---	---
Wa----------------------- Walpole	IIIw	16	6.0	3.5	3.5	7.6
Wh----------------------- Whitman	VIIs	---	---	---	---	---
WnB---------------------- Windsor	IIIs	14	---	3.0	2.5	5.5
WnC---------------------- Windsor	IVs	12	---	3.0	2.5	5.0
WnD---------------------- Windsor	VIs	---	---	2.5	2.0	4.5
WsB---------------------- Woodbridge	VIs	---	---	---	---	---
WtB, WtC, WtD------------ Woodbridge	VIIs	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Dashes indicate no acreage)

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I:				
Hampden County	---	---	---	---
Hampshire County	---	---	---	---
II:				
Hampden County	2,765	655	1,170	940
Hampshire County	4,150	885	1,700	1,565
III:				
Hampden County	4,695	915	1,520	2,260
Hampshire County	6,740	530	1,000	5,210
IV:				
Hampden County	2,880	---	380	2,500
Hampshire County	3,615	---	305	3,310
V:				
Hampden County	3,390	---	3,390	---
Hampshire County	2,575	---	2,575	---
VI:				
Hampden County	4,940	---	---	4,940
Hampshire County	9,375	---	---	9,375
VII:				
Hampden County	45,885	---	---	45,885
Hampshire County	43,055	---	---	43,055
VIII:				
Hampden County	---	---	---	---
Hampshire County	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
BoB, BoC-------- Brookfield	3X	Slight	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine--	65 55 65	3 2 8	Eastern white pine, eastern hemlock, European larch.
BoD------------- Brookfield	3X	Moderate	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine--	65 55 65	3 2 8	Eastern white pine, eastern hemlock, European larch.
BrC**:									
Brookfield-----	3X	Slight	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine--	65 55 65	3 2 8	Eastern white pine, eastern hemlock, European larch.
Brimfield------	2X	Slight	Moderate	Moderate	Severe	Northern red oak---- Eastern white pine-- Red pine------------	47 55 55	2 6 5	Eastern white pine.
Rock outcrop.									
BrE**:									
Brookfield-----	3X	Moderate	Moderate	Slight	Slight	Northern red oak---- Sugar maple--------- Eastern white pine--	65 55 65	3 2 8	Eastern white pine, eastern hemlock, European larch.
Brimfield------	2X	Moderate	Moderate	Moderate	Severe	Northern red oak---- Eastern white pine-- Red pine------------	47 55 55	2 6 5	Eastern white pine.
Rock outcrop.									
CaB, CaC-------- Canton	7A	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak----	58 52	7 2	Eastern white pine, white spruce.
CcB, CcC, CcD--- Canton	7X	Slight	Moderate	Slight	Slight	Eastern white pine-- Northern red oak----	58 52	7 2	Eastern white pine, white spruce.
CmB------------- Charlton	3A	Slight	Slight	Slight	Slight	Northern red oak---- Eastern white pine-- Red pine------------ Red spruce---------- Red maple-----------	65 65 70 50 55	3 8 8 8 2	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
CnB, CnC--------Charlton	3X	Slight	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	8	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
CnD-------------Charlton	3X	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	8	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
CrC**:									
Charlton-------	3X	Slight	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	8	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
Hollis---------	2X	Slight	Moderate	Moderate	Severe	Northern red oak----	47	2	Eastern white pine.
						Eastern white pine--	55	6	
						Sugar maple---------	56	2	
Rock outcrop.									
CrE**:									
Charlton-------	3X	Moderate	Moderate	Slight	Slight	Northern red oak----	65	3	Eastern white pine, red pine, white spruce, eastern hemlock, European larch.
						Eastern white pine--	65	8	
						Red pine------------	70	8	
						Red spruce----------	50	8	
						Red maple-----------	55	2	
Hollis---------	2X	Moderate	Moderate	Moderate	Severe	Northern red oak----	47	2	Eastern white pine.
						Eastern white pine--	55	6	
						Sugar maple---------	56	2	
Rock outcrop.									
De--------------Deerfield	8S	Slight	Slight	Moderate	Slight	Eastern white pine--	65	8	Eastern white pine, red pine, European larch.
						Northern red oak----	55	3	
EeB, EsB, EsC---Essex	8S	Slight	Slight	Moderate	Slight	Red pine------------	70	8	Red pine, eastern white pine, European larch.
						Eastern white pine--	60	7	
						Northern red oak----	60	3	
						Sugar maple---------	55	2	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
ExB, ExC, ExD--- Essex	8X	Slight	Moderate	Moderate	Slight	Red pine------------ Eastern white pine-- Northern red oak---- Sugar maple---------	70 60 60 55	8 7 3 2	Red pine, eastern white pine, European larch.
Fm-------------- Freetown	2W	Slight	Severe	Severe	Severe	Red maple----------- Atlantic white-cedar Eastern hemlock----- Green ash----------- American elm-------- Red spruce---------- Balsam fir----------	50 60 55 35 55 50 45	2 -- -- 2 -- 8 6	White spruce, eastern hemlock, balsam fir.
GfB------------- Gloucester	3S	Slight	Slight	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine------------ Sugar maple---------	60 61 49 53	3 7 4 2	Eastern white pine, red pine, European larch.
GhB, GhC-------- Gloucester	3S	Slight	Slight	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine------------	60 61 49	3 7 4	Eastern white pine, red pine, European larch.
GxB, GxC-------- Gloucester	3X	Slight	Moderate	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine------------	60 61 49	3 7 4	Eastern white pine, red pine, European larch.
GxD------------- Gloucester	3X	Slight	Moderate	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine------------	60 61 49	3 7 4	Eastern white pine, red pine, European larch.
GyE**:									
Gloucester-----	3X	Slight	Moderate	Moderate	Slight	Northern red oak---- Eastern white pine-- Red pine------------	60 61 49	3 7 4	Eastern white pine, red pine, European larch.
Canton---------	7X	Slight	Moderate	Slight	Slight	Eastern white pine-- Northern red oak----	58 52	7 2	Eastern white pine, white spruce.
HgA, HgB, HgC--- Hinckley	7S	Slight	Slight	Severe	Slight	Eastern white pine-- Northern red oak---- Red pine------------ Sugar maple---------	60 49 58 57	7 2 6 2	Eastern white pine.
HgD, HgE-------- Hinckley	7S	Moderate	Moderate	Severe	Slight	Eastern white pine-- Northern red oak---- Red pine------------ Sugar maple---------	60 49 58 57	7 2 6 2	Eastern white pine.
MeA, MeB, MeC--- Merrimac	2S	Slight	Slight	Moderate	Slight	Northern red oak---- Eastern white pine-- Sugar maple---------	51 64 58	2 8 3	Eastern white pine, red pine.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
MoB----------- Montauk	3A	Slight	Slight	Slight	Slight	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 75 75 65	3 8 10 3	Norway spruce, white spruce, European larch.
MsB, MsC-------- Montauk	3A	Slight	Slight	Slight	Slight	Northern red oak---- Red pine----------- Sugar maple---------	65 75 65	4 8 3	Norway spruce, white spruce, red pine.
MsD----------- Montauk	3R	Slight	Moderate	Slight	Slight	Northern red oak---- Red pine----------- Sugar maple---------	65 75 65	4 8 3	Norway spruce, white spruce, red pine.
MxB, MxC, MxD--- Montauk	3X	Slight	Moderate	Slight	Slight	Northern red oak---- Eastern white pine--	65 75	3 10	Eastern white pine, European larch.
PaB, PaC-------- Paxton	3A	Slight	Slight	Moderate	Slight	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PbB, PbC-------- Paxton	3A	Slight	Slight	Slight	Moderate	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PcB, PcC-------- Paxton	3X	Slight	Moderate	Slight	Moderate	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PcD----------- Paxton	3X	Moderate	Moderate	Slight	Moderate	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
PeE**:									
Paxton---------	3X	Moderate	Moderate	Slight	Moderate	Northern red oak---- Red pine----------- Eastern white pine-- Sugar maple---------	65 67 66 75	3 8 8 3	Red pine, eastern white pine, Norway spruce, European larch.
Montauk--------	3X	Slight	Moderate	Slight	Slight	Eastern white pine--	75	10	Eastern white pine, European larch.

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Pv-------------- Pootatuck	10A	Slight	Slight	Slight	Slight	Eastern white pine--	75	10	Eastern white pine, white spruce.
						Red pine------------	75	8	
						Red maple-----------	60	3	
						Yellow birch--------	60	3	
RdB------------- Ridgebury	3W	Slight	Severe	Severe	Severe	Northern red oak----	57	3	Eastern white pine, white spruce.
						Red spruce----------	47	7	
						Eastern white pine--	63	8	
						Sugar maple---------	52	2	
ReA, ReB-------- Ridgebury	3X	Slight	Severe	Severe	Severe	Northern red oak----	57	3	Eastern white pine, white spruce.
						Red spruce----------	47	7	
						Eastern white pine--	63	8	
						Sugar maple---------	52	2	
Rm-------------- Rippowam	3W	Slight	Severe	Severe	Severe	Red maple-----------	75	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
Sb**:									
Scarboro-------	6W	Slight	Severe	Severe	Severe	Eastern white pine--	55	6	Northern white-cedar.
						Red maple-----------	55	2	
						Atlantic white-cedar	45	--	
Rippowam-------	3W	Slight	Severe	Severe	Severe	Red maple-----------	75	3	Eastern white pine, white spruce.
						Eastern white pine--	65	8	
SgB, SgC, ShB, ShC------------ Scituate	3A	Slight	Slight	Slight	Slight	Northern red oak----	61	3	Eastern white pine.
						Eastern white pine--	65	8	
						Sugar maple---------	55	2	
						Red pine------------	70	9	
StB, StC-------- Scituate	3X	Slight	Slight	Slight	Slight	Northern red oak----	61	3	Eastern white pine.
						Eastern white pine--	65	8	
						Sugar maple---------	55	2	
						Red pine------------	70	9	
StD------------- Scituate	3X	Moderate	Moderate	Slight	Slight	Northern red oak----	61	3	Eastern white pine.
						Eastern white pine--	65	8	
						Sugar maple---------	55	2	
						Red pine------------	70	9	
SuA, SuB-------- Sudbury	7A	Slight	Slight	Slight	Slight	Eastern white pine--	60	7	Eastern white pine, red pine, European larch, white spruce, Norway spruce.
						Northern red oak----	45	2	
						Red spruce----------	47	7	
						Red pine------------	60	6	
Sw-------------- Swansea	2W	Slight	Severe	Severe	Severe	Red maple-----------	50	2	White spruce, eastern hemlock, balsam fir.
						Atlantic white-cedar	60	--	
						Eastern hemlock-----	55	--	
						Green ash-----------	35	2	
						American elm--------	55	--	
						Red spruce----------	50	8	
						Balsam fir----------	45	6	

See footnotes at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Productivity class*	Trees to plant
Wa-------------- Walpole	3W	Slight	Severe	Severe	Severe	Red maple-----------	75	3	Eastern white pine, white spruce, northern white-cedar, Norway spruce.
						White ash-----------	61	3	
						Eastern hemlock-----	54	8	
						Eastern white pine--	68	8	
Wh-------------- Whitman	7X	Slight	Severe	Severe	Severe	Eastern white pine--	56	7	
						Red spruce----------	44	6	
						Red maple-----------	55	2	
WnB, WnC-------- Windsor	7S	Slight	Slight	Severe	Slight	Eastern white pine--	57	7	Eastern white pine, red pine, Norway spruce.
						Northern red oak----	52	2	
						Red pine------------	61	7	
						Sugar maple---------	55	2	
WnD------------- Windsor	7S	Moderate	Moderate	Severe	Slight	Eastern white pine--	57	7	Eastern white pine, red pine, Norway spruce.
						Northern red oak----	52	2	
						Red pine------------	61	7	
						Sugar maple---------	55	2	
WsB------------- Woodbridge	8A	Slight	Slight	Slight	Moderate	Eastern white pine--	67	8	Eastern white pine, red pine, European larch.
						Northern red oak----	72	4	
						Red pine------------	65	8	
						Red spruce----------	50	8	
						Sugar maple---------	65	3	
WtB, WtC-------- Woodbridge	8X	Moderate	Moderate	Slight	Moderate	Eastern white pine--	67	8	Eastern white pine, red pine, European larch.
						Northern red oak----	72	4	
						Red pine------------	65	8	
						Red spruce----------	50	8	
						Sugar maple---------	65	3	
WtD------------- Woodbridge	8X	Moderate	Moderate	Slight	Moderate	Eastern white pine--	67	8	Eastern white pine, red pine, European larch.
						Northern red oak----	72	4	
						Red pine------------	65	8	
						Red spruce----------	50	8	
						Sugar maple---------	65	3	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BoB------------------- Brookfield	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
BoC------------------- Brookfield	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
BoD------------------- Brookfield	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
BrC*:					
Brookfield-----------	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
Brimfield------------	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight----------	Severe: thin layer.
Rock outcrop.					
BrE*:					
Brookfield-----------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Brimfield------------	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
Rock outcrop.					
CaB------------------- Canton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
CaC------------------- Canton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight----------	Moderate: large stones, slope.
CcB------------------- Canton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
CcC------------------- Canton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight----------	Moderate: large stones, slope.
CcD------------------- Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
CmB------------------- Charlton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CnB-------------------- Charlton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
CnC-------------------- Charlton	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
CnD-------------------- Charlton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
CrC*:					
Charlton-------------	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
Hollis---------------	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight----------	Severe: thin layer.
Rock outcrop.					
CrE*:					
Charlton-------------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Hollis---------------	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
Rock outcrop.					
De--------------------- Deerfield	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight----------	Moderate: wetness.
Du*. Dumps					
EeB-------------------- Essex	Moderate: small stones, wetness.	Moderate: wetness, small stones.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: small stones, droughty.
EsB-------------------- Essex	Moderate: large stones, wetness.	Moderate: wetness, large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, droughty.
EsC-------------------- Essex	Moderate: large stones, slope, wetness.	Moderate: slope, wetness, large stones.	Severe: slope, large stones.	Moderate: wetness.	Moderate: large stones, droughty, slope.
ExB-------------------- Essex	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, droughty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ExC: Essex	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Moderate: wetness.	Moderate: large stones, droughty, slope.
ExD: Essex	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Moderate: wetness, slope.	Severe: slope.
Fm: Freetown	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
GfB: Gloucester	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
GhB: Gloucester	Moderate: large stones.	Moderate: large stones.	Severe: large stones, small stones.	Slight	Moderate: small stones, droughty.
GhC: Gloucester	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones, small stones.	Slight	Moderate: slope, small stones, droughty.
GxB: Gloucester	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
GxC: Gloucester	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Moderate: large stones.	Severe: large stones.
GxD: Gloucester	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Moderate: large stones, slope.	Severe: slope, large stones.
GyE*:					
Gloucester	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Severe: slope.	Severe: slope, large stones.
Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
HgA: Hinckley	Slight	Slight	Moderate: small stones.	Moderate: too sandy.	Moderate: droughty.
HgB: Hinckley	Slight	Slight	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
HgC: Hinckley	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HgD------------------- Hinckley	Moderate: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.
HgE------------------- Hinckley	Moderate: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MeA------------------- Merrimac	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
MeB------------------- Merrimac	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
MeC------------------- Merrimac	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
MoB------------------- Montauk	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones.	Slight----------	Slight.
MsB------------------- Montauk	Moderate: large stones, percs slowly.	Moderate: large stones.	Severe: large stones, small stones.	Slight----------	Moderate: small stones, large stones.
MsC------------------- Montauk	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope, small stones.	Slight----------	Moderate: small stones, large stones, slope.
MsD------------------- Montauk	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
MxB------------------- Montauk	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: large stones.	Moderate: small stones, large stones.
MxC------------------- Montauk	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Moderate: small stones, large stones, slope.
MxD------------------- Montauk	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope, large stones.	Severe: slope.
PaB------------------- Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
PaC------------------- Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
PbB------------------- Paxton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PbC------------------- Paxton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
PcB------------------- Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
PcC------------------- Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
PcD------------------- Paxton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
PeE*:					
Paxton---------------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
Montauk--------------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope, large stones.	Severe: slope.
Pg*. Pits					
Pv-------------------- Pootatuck	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
RdB------------------- Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
ReA, ReB-------------- Ridgebury	Severe: large stones, wetness, percs slowly.	Severe: large stones, wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.
Rm-------------------- Rippowam	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Sb*:					
Scarboro-------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Rippowam-------------	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
SgB------------------- Scituate	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: small stones, wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SgC: Scituate	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
ShB: Scituate	Moderate: large stones, small stones.	Moderate: large stones, wetness.	Severe: large stones, small stones.	Moderate: wetness.	Moderate: large stones.
ShC: Scituate	Moderate: slope, large stones, wetness.	Moderate: slope, large stones, wetness.	Severe: slope, large stones, small stones.	Moderate: wetness.	Moderate: slope, large stones.
StB: Scituate	Severe: large stones.	Severe: large stones.	Severe: large stones, small stones.	Moderate: wetness.	Severe: large stones.
StC: Scituate	Severe: large stones.	Severe: large stones.	Severe: slope, large stones, small stones.	Moderate: wetness.	Severe: large stones.
StD: Scituate	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones, small stones.	Moderate: wetness, slope.	Severe: large stones, slope.
SuA: Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight	Slight.
SuB: Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Slight	Slight.
Sw: Swansea	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Wa: Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wh: Whitman	Severe: large stones, ponding.	Severe: large stones, ponding.	Severe: ponding, large stones.	Severe: ponding.	Severe: large stones, ponding.
WnB: Windsor	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
WnC: Windsor	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
WnD: Windsor	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
WsB: Woodbridge	Moderate: large stones, wetness.	Moderate: wetness, large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.
WtB: Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.
WtC: Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness, slope.
WtD: Woodbridge	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: wetness, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BoB----------------- Brookfield	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
BoC, BoD----------- Brookfield	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
BrC*, BrE*:										
Brookfield---------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Brimfield----------	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
CaB----------------- Canton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CaC----------------- Canton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CcB----------------- Canton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
CcC, CcD----------- Canton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CmB----------------- Charlton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
CnB----------------- Charlton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
CnC, CnD----------- Charlton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
CrC*, CrE*:										
Charlton-----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Hollis-------------	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.										
De------------------ Deerfield	Poor	Fair	Fair	Poor	Poor	Poor	Poor	Fair	Poor	Poor.
Du*. Dumps										
EeB----------------- Essex	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	Fair	Very poor.
EsB----------------- Essex	Very poor.	Poor	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
EsC: Essex	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
ExB: Essex	Very poor.	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
ExC, ExD: Essex	Very poor.	Very poor.	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Fm: Freetown	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
GfB: Gloucester	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GhB, GhC: Gloucester	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GxB, GxC, GxD: Gloucester	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
GyE*:										
Gloucester	Very poor.	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Canton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
HgA, HgB, HgC, HgD: Hinckley	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HgE: Hinckley	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
MeA, MeB, MeC: Merrimac	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
MoB: Montauk	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MsB: Montauk	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
MsC, MsD: Montauk	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
MxB: Montauk	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
MxC, MxD: Montauk	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
PaB: Paxton	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PaC: Paxton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PbB: Paxton	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
PbC----------------- Paxton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
PcB----------------- Paxton	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
PcC, PcD----------- Paxton	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
PeE*:										
Paxton------------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Montauk-----------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Pg*. Pits										
Pv------------------ Pootatuck	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
RdB----------------- Ridgebury	Poor	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
ReA----------------- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	Good	Fair	Poor	Fair	Fair.
ReB----------------- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
Rm------------------ Rippowam	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Sb*:										
Scarboro----------	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Rippowam----------	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
SgB----------------- Scituate	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SgC----------------- Scituate	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ShB----------------- Scituate	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
ShC----------------- Scituate	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
StB----------------- Scituate	Very poor.	Very poor.	Good	Good	Good	Poor	Very poor.	Poor	Fair	Very poor.
StC, StD----------- Scituate	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
SuA----------------- Sudbury	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
SuB----------------- Sudbury	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Sw----------------- Swansea	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Wa----------------- Walpole	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Wh----------------- Whitman	Very poor.	Very poor.	Poor	Poor	Poor	Good	Fair	Very poor.	Poor	Fair.
WnB, WnC, WnD------ Windsor	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
WsB---------------- Woodbridge	Very poor.	Poor	Good	Good	Fair	Poor	Very poor.	Poor	Good	Very poor.
WtB---------------- Woodbridge	Very poor.	Very poor.	Good	Good	Fair	Poor	Very poor.	Poor	Good	Very poor.
WtC, WtD----------- Woodbridge	Very poor.	Very poor.	Good	Good	Fair	Very poor.	Very poor.	Poor	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BoB: Brookfield	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
BoC: Brookfield	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
BoD: Brookfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
BrC*:						
Brookfield	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
Brimfield	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
BrE*:						
Brookfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Brimfield	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Rock outcrop.						
CaB: Canton	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.
CaC: Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CcB: Canton	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.
CcC: Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CcD: Canton	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CmB, CnB: Charlton	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones.
CnC: Charlton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CnD--------------- Charlton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CrC*:						
Charlton----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
Hollis------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
CrE*:						
Charlton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hollis------------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Rock outcrop.						
De---------------- Deerfield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
Du*. Dumps						
EeB--------------- Essex	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: small stones, droughty.
EsB--------------- Essex	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones, droughty.
EsC--------------- Essex	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope.	Moderate: large stones, droughty, slope.
ExB--------------- Essex	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones, droughty.
ExC--------------- Essex	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope.	Moderate: large stones, droughty, slope.
ExD--------------- Essex	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Fm---------------- Freetown	Severe: wetness, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
GfB--------------- Gloucester	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Moderate: small stones, droughty.
GhB--------------- Gloucester	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones, slope.	Moderate: large stones.	Moderate: small stones, droughty.
GhC--------------- Gloucester	Severe: cutbanks cave.	Moderate: large stones, slope.	Moderate: large stones, slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope, small stones, droughty.
GxB--------------- Gloucester	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones, slope.	Moderate: large stones.	Severe: large stones.
GxC--------------- Gloucester	Severe: cutbanks cave.	Moderate: large stones, slope.	Moderate: large stones, slope.	Severe: slope.	Moderate: slope, large stones.	Severe: large stones.
GxD--------------- Gloucester	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
GyE*:						
Gloucester-------	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, large stones.
Canton-----------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HgA--------------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
HgB--------------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
HgC--------------- Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
HgD, HgE---------- Hinckley	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MeA--------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
MeB--------------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
MeC--------------- Merrimac	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MoB--------------- Montauk	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MsB--------------- Montauk	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones, large stones.
MsC--------------- Montauk	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: small stones, large stones, slope.
MsD--------------- Montauk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MxB--------------- Montauk	Moderate: dense layer, wetness.	Moderate: wetness, large stones.	Moderate: wetness.	Moderate: slope, large stones.	Moderate: wetness, large stones.	Moderate: small stones, large stones.
MxC--------------- Montauk	Moderate: dense layer, wetness, slope.	Moderate: slope, large stones.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: small stones, large stones, slope.
MxD--------------- Montauk	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PaB--------------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.
PaC--------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
PbB--------------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
PbC--------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
PcB--------------- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
PcC--------------- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
PcD--------------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PeE*:						
Paxton-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Montauk----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Pg*. Pits						
Pv----------------- Pootatuck	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.
RdB, ReA, ReB----- Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Rm----------------- Rippowam	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
Sb*:						
Scarboro---------	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Rippowam---------	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
SgB--------------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: small stones, wetness.
SgC--------------- Scituate	Severe: wetness.	Moderate: wetness, slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: wetness, slope.
ShB--------------- Scituate	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
ShC--------------- Scituate	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope, large stones.
StB--------------- Scituate	Severe: wetness.	Moderate: wetness, large stones.	Severe: wetness.	Moderate: wetness, slope, large stones.	Moderate: wetness, frost action.	Severe: large stones.
StC--------------- Scituate	Severe: wetness.	Moderate: wetness, slope, large stones.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, frost action.	Severe: large stones.
StD--------------- Scituate	Severe: wetness, slope.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.	Severe: large stones, slope.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SuA--------------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.
SuB--------------- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness, frost action.	Slight.
Sw---------------- Swansea	Severe: wetness, excess humus, cutbanks cave.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.
Wa---------------- Walpole	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Wh---------------- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, ponding.	Severe: large stones, ponding.
WnB--------------- Windsor	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
WnC--------------- Windsor	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
WnD--------------- Windsor	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WsB, WtB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: large stones, wetness.
WtC--------------- Woodbridge	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, wetness, slope.
WtD--------------- Woodbridge	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BoB: Brookfield	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
BoC: Brookfield	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
BoD: Brookfield	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
BrC*:					
Brookfield	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Brimfield	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
BrE*:					
Brookfield	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Brimfield	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope, thin layer.
Rock outcrop.					
CaB: Canton	Severe: Poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CaC: Canton	Severe: Poor filter, slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcB: Canton	Severe: Poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcC: Canton	Severe: Poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcD: Canton	Severe: slope.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CmB, CnB: Charlton	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
CnC: Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
CnD: Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CrC*:					
Charlton	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
Hollis	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
CrE*:					
Charlton	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Hollis	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope, thin layer.
Rock outcrop.					
De: Deerfield	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Du*. Dumps					
EeB, EsB: Essex	Severe: percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Poor: seepage.
EsC: Essex	Severe: percs slowly.	Severe: slope, seepage.	Moderate: wetness, slope.	Severe: seepage.	Poor: seepage.
ExB: Essex	Severe: percs slowly.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Poor: seepage.
ExC: Essex	Severe: percs slowly.	Severe: slope, seepage.	Moderate: wetness, slope.	Severe: seepage.	Poor: seepage.
ExD: Essex	Severe: slope, percs slowly.	Severe: slope, seepage.	Severe: slope.	Severe: slope, seepage.	Poor: slope, seepage.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Fm----------------- Freetown	Severe: wetness.	Severe: wetness, excess humus, seepage.	Severe: wetness, excess humus, seepage.	Severe: wetness, seepage.	Poor: excess humus, wetness.
GfB----------------- Gloucester	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
GhB----------------- Gloucester	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
GhC----------------- Gloucester	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
GxB----------------- Gloucester	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
GxC----------------- Gloucester	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones, seepage.
GxD----------------- Gloucester	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
GyE*:					
Gloucester---------	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones, seepage.
Canton-------------	Severe: slope, large stones.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
HgA, HgB------------ Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HgC----------------- Hinckley	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
HgD, HgE------------ Hinckley	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, too sandy, slope.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
MeA, MeB------------ Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
MeC----------------- Merrimac	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MoB----------------- Montauk	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Poor: seepage.
MsB----------------- Montauk	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Poor: seepage.
MsC----------------- Montauk	Severe: percs slowly, wetness.	Severe: seepage, slope.	Moderate: wetness, slope.	Severe: seepage.	Poor: seepage.
MsD----------------- Montauk	Severe: percs slowly, slope, wetness.	Severe: slope, seepage.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
MxB----------------- Montauk	Severe: percs slowly, wetness.	Severe: seepage.	Moderate: wetness.	Severe: seepage.	Poor: seepage.
MxC----------------- Montauk	Severe: percs slowly, wetness.	Severe: seepage, slope.	Moderate: wetness, slope.	Severe: seepage.	Poor: seepage.
MxD----------------- Montauk	Severe: percs slowly, slope, wetness.	Severe: slope, seepage.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
PaB----------------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PaC----------------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PbB----------------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PbC----------------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PcB----------------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PcC----------------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PcD: Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PeE*:					
Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Montauk	Severe: percs slowly, slope, wetness.	Severe: slope.	Severe: slope.	Severe: slope, seepage.	Poor: seepage, slope.
Pg*. Pits					
Pv: Pootatuck	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.
RdB, ReA: Ridgebury	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
ReB: Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rm: Rippowam	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Sb*:					
Scarboro	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, small stones.
Rippowam	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
SgB: Scituate	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
SgC: Scituate	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
ShB: Scituate	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ShC----------------- Scituate	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
StB----------------- Scituate	Severe: wetness, percs slowly.	Moderate: slope, large stones.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
StC----------------- Scituate	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
StD----------------- Scituate	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
SuA, SuB------------ Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
Sw------------------ Swansea	Severe: wetness, poor filter.	Severe: wetness, excess humus, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus, seepage.
Wa------------------ Walpole	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Wh------------------ Whitman	Severe: percs slowly, ponding.	Slight-----------	Severe: ponding.	Severe: ponding.	Poor: ponding.
WnB----------------- Windsor	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
WnC----------------- Windsor	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
WnD----------------- Windsor	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
WsB, WtB------------ Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WtC----------------- Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WtD----------------- Woodbridge	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BoB------------------- Brookfield	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
BoC------------------- Brookfield	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
BoD------------------- Brookfield	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BrC*:				
Brookfield-----------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Brimfield------------	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer.
Rock outcrop.				
BrE*:				
Brookfield-----------	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Brimfield------------	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer, slope.
Rock outcrop.				
CaB, CaC, CcB, CcC---- Canton	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CcD------------------- Canton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CmB, CnB-------------- Charlton	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
CnC------------------- Charlton	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
CnD------------------- Charlton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CrC*:				
Charlton-------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CrC*:				
Hollis	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer.
Rock outcrop.				
CrE*:				
Charlton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hollis	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, thin layer, slope.
Rock outcrop.				
De Deerfield	Fair: wetness.	Probable	Improbable: excess fines.	Poor: too sandy, thin layer.
Du*. Dumps				
EeB Essex	Fair: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: area reclaim, small stones.
EsB, EsC, ExB, ExC Essex	Fair: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: large stones, area reclaim.
ExD Essex	Fair: slope, wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: large stones, area reclaim, slope.
Fm Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
GfB, GhB, GhC, GxB, GxC Gloucester	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GxD Gloucester	Fair: slope, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
GyE*:				
Gloucester	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
GyE*: Canton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
HgA, HgB, HgC Hinckley	Good	Probable	Probable	Poor: too sandy, area reclaim, small stones.
HgD Hinckley	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, slope.
HgE Hinckley	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, slope.
MeA, MeB, MeC Merrimac	Good	Probable	Probable	Poor: small stones, area reclaim.
MoB, MsB, MsC Montauk	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
MsD Montauk	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
MxB, MxC Montauk	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones.
MxD Montauk	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
PaB Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PaC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PbB Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PbC Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PcB Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PcC: Paxton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PcD: Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PeE*:				
Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Montauk	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: large stones, slope.
Pg*. Pits				
Pv: Pootatuck	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
RdB, ReA, ReB: Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
Rm: Rippowam	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
Sb*:				
Scarboro	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, small stones, area reclaim.
Rippowam	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
SgB, SgC: Scituate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
ShB, ShC: Scituate	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones. area reclaim.
StB, StC: Scituate	Fair: large stones, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones. area reclaim.
StD: Scituate	Fair: large stones, wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
SuA, SuB: Sudbury	Fair: wetness.	Probable	Probable	Poor: small stones, too sandy, area reclaim.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Sw: Swansea	Poor: wetness.	Probable	Improbable: excess fines.	Poor: wetness, excess humus.
Wa: Walpole	Poor: wetness.	Probable	Probable	Poor: small stones, wetness.
Wh: Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
WnB, WnC: Windsor	Good	Probable	Improbable: too sandy.	Poor: too sandy.
WnD: Windsor	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
WsB, WtB: Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WtC: Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
WtD: Woodbridge	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
BoB: Brookfield	Severe: seepage.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
BoC, BoD: Brookfield	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope	Slope	Slope.
BrC*, BrE*:						
Brookfield	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Brimfield	Severe: depth to rock, slope.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
CaB: Canton	Severe: seepage.	Severe: no water.	Deep to water	Slope	Large stones, too sandy.	Large stones.
CaC: Canton	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope	Slope, large stones, too sandy.	Large stones, slope.
CcB: Canton	Severe: seepage.	Severe: no water.	Deep to water	Slope	Large stones, too sandy.	Large stones.
CcC, CcD: Canton	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope	Slope, large stones, too sandy.	Large stones, slope.
CmB, CnB: Charlton	Severe: seepage.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
CnC, CnD: Charlton	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope	Slope	Slope.
CrC*, CrE*:						
Charlton	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Hollis	Severe: depth to rock, slope.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
De: Deerfield	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, wetness, droughty.	Wetness, too sandy.	Droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Du*. Dumps						
EeB: Essex	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Rooting depth, slope.	Too sandy, rooting depth.	Droughty, rooting depth.
EsB: Essex	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Fast intake, percs slowly, rooting depth.	Large stones, rooting depth.	Large stones, droughty, rooting depth.
EsC: Essex	Severe: seepage, slope.	Severe: no water.	Percs slowly, slope.	Fast intake, percs slowly, rooting depth.	Slope, large stones, rooting depth.	Large stones, slope, droughty.
ExB: Essex	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Fast intake, percs slowly, rooting depth.	Large stones, rooting depth.	Large stones, droughty, rooting depth.
ExC, ExD: Essex	Severe: seepage, slope.	Severe: no water.	Percs slowly, slope.	Fast intake, percs slowly, rooting depth.	Slope, large stones, rooting depth.	Large stones, slope, droughty.
Fm: Freetown	Severe: seepage.	Slight	Frost action	Wetness	Wetness	Wetness.
GfB: Gloucester	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, large stones.	Large stones, too sandy.	Large stones, droughty.
GhB: Gloucester	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
GhC: Gloucester	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Slope, large stones, droughty.
GxB: Gloucester	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
GxC, GxD: Gloucester	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Slope, large stones, droughty.
GyE*:						
Gloucester	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, too sandy.	Slope, large stones, droughty.
Canton	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope	Slope, large stones, too sandy.	Large stones, slope.
HgA: Hinckley	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Large stones, too sandy.	Large stones, droughty.
HgB: Hinckley	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, too sandy.	Large stones, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
HgC, HgD, HgE----- Hinckley	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, large stones, too sandy.	Large stones, slope, droughty.
MeA--------------- Merrimac	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Too sandy------	Favorable.
MeB--------------- Merrimac	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Too sandy------	Favorable.
MeC--------------- Merrimac	Severe: slope, seepage.	Severe: no water.	Deep to water	Slope----------	Slope, too sandy.	Slope.
MoB--------------- Montauk	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
MsB--------------- Montauk	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
MsC, MsD---------- Montauk	Severe: seepage, slope.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
MxB--------------- Montauk	Severe: seepage.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Percs slowly, rooting depth.	Rooting depth, percs slowly.
MxC, MxD---------- Montauk	Severe: seepage, slope.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Slope, percs slowly, rooting depth.	Slope, rooting depth, percs slowly.
PaB--------------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
PaC--------------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
PbB--------------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
PbC--------------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
PcB--------------- Paxton	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
PcC, PcD---------- Paxton	Severe: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
PeE*:						
Paxton	Severe: slope.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.	Slope, rooting depth, percs slowly.
Montauk	Severe: seepage, slope.	Severe: no water.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Slope, percs slowly, rooting depth.	Slope, rooting depth, percs slowly.
Pg*. Pits						
Pv Pootatuck	Severe: seepage.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, flooding.	Wetness, too sandy.	Favorable.
RdB, ReA Ridgebury	Slight	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
ReB Ridgebury	Moderate: slope.	Severe: no water.	Slope, percs slowly, frost action.	Slope, wetness, percs slowly.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
Rm Rippowam	Severe: seepage.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, flooding.	Wetness, too sandy, poor outlets.	Wetness.
Sb*:						
Scarboro	Severe: seepage.	Severe: cutbanks cave.	Ponding, frost action, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy.	Wetness, droughty.
Rippowam	Severe: seepage.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, flooding.	Wetness, too sandy, poor outlets.	Wetness.
SgB Scituate	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, droughty.	Wetness, percs slowly.	Droughty, rooting depth.
SgC Scituate	Severe: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, droughty.	Slope, wetness, percs slowly.	Slope, droughty, rooting depth.
ShB Scituate	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, droughty.	Large stones, wetness, percs slowly.	Large stones, droughty, rooting depth.
ShC Scituate	Severe: slope.	Severe: no water.	Percs slowly, slope.	Slope, wetness, droughty.	Slope, large stones, wetness.	Large stones, slope, droughty.
StB Scituate	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Large stones, wetness, percs slowly.	Large stones, droughty, rooting depth.
StC, StD Scituate	Severe: slope.	Severe: no water.	Percs slowly, slope.	Slope, large stones, wetness.	Slope, large stones, wetness.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
SuA: Sudbury	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness	Too sandy, wetness.	Favorable.
SuB: Sudbury	Severe: seepage.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, slope.	Too sandy, wetness.	Favorable.
Sw: Swansea	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness	Wetness, too sandy.	Wetness.
Wa: Walpole	Severe: seepage.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness.
Wh: Whitman	Slight	Severe: no water.	Percs slowly, frost action.	Ponding, percs slowly, rooting depth.	Wetness, percs slowly, large stones.	Large stones, wetness, percs slowly.
WnB: Windsor	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy	Droughty.
WnC, WnD: Windsor	Severe: seepage, slope.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy.	Slope, droughty.
WsB, WtB: Woodbridge	Moderate: slope.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Rooting depth, percs slowly.
WtC, WtD: Woodbridge	Severe: slope.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness, percs slowly.	Slope, rooting depth, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BoB, BoC, BoD---- Brookfield	0-2	Fine sandy loam	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-80	25-65	<25	NP-5
	2-65	Gravelly sandy loam, gravelly fine sandy loam, fine sandy loam.	SM, GM	A-2, A-4	0-15	65-100	60-95	40-70	25-45	---	NP
BrC*, BrE*:											
Brookfield------	0-2	Fine sandy loam	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-80	25-65	<25	NP-5
	2-65	Gravelly sandy loam, gravelly fine sandy loam, fine sandy loam.	SM, GM	A-2, A-4	0-15	65-100	60-95	40-70	25-45	---	NP
Brimfield-------	0-2	Fine sandy loam	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-85	20-65	<25	NP-5
	2-15	Gravelly fine sandy loam, sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
CaB, CaC--------- Canton	0-7	Fine sandy loam	SM, ML	A-2, A-4	5-15	80-95	70-90	50-85	30-60	<25	NP-8
	7-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<25	NP-8
	26-65	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
CcB, CcC, CcD---- Canton	0-7	Fine sandy loam	SM, ML	A-2, A-4	10-30	70-95	60-90	40-85	25-60	<25	NP-8
	7-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<25	NP-8
	26-65	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
CmB-------------- Charlton	0-2	Fine sandy loam	SM, ML	A-2, A-4	10-20	75-95	70-90	60-85	30-70	<25	NP-5
	2-25	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	50-80	20-65	<25	NP-3
	25-65	Fine sandy loam, gravelly fine sandy loam, gravelly sandy loam.	SM, ML	A-2, A-4	5-25	60-90	55-85	40-75	20-50	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CnB, CnC, CnD---- Charlton	0-2	Fine sandy loam	SM, ML	A-2, A-4	15-25	75-95	70-90	60-85	30-70	<25	NP-5
	2-25	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	50-80	20-65	<25	NP-3
	25-65	Fine sandy loam, gravelly fine sandy loam, gravelly sandy loam.	SM, ML	A-2, A-4	5-25	60-90	55-85	40-75	20-50	---	NP
CrC*, CrE*: Charlton--------	0-2	Fine sandy loam	SM, ML	A-2, A-4	15-25	75-95	70-90	60-85	30-70	<25	NP-5
	2-25	Fine sandy loam, gravelly fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	65-90	60-90	50-80	20-65	<25	NP-3
	25-65	Fine sandy loam, gravelly fine sandy loam, gravelly sandy loam.	SM, ML	A-2, A-4	5-25	60-90	55-85	40-75	20-50	---	NP
Hollis----------	0-2	Fine sandy loam	SM, ML, GM	A-2, A-4	15-30	65-100	60-95	40-85	20-65	<25	NP-5
	2-16	Gravelly fine sandy loam, sandy loam, loam.	SM, ML, GM	A-2, A-4	0-15	65-100	60-95	40-80	20-65	<25	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
De--------------- Deerfield	0-6	Loamy fine sand	SP-SM, SM	A-1, A-2, A-3, A-4	0	95-100	80-100	40-75	5-40	---	NP
	6-23	Loamy sand, sand, coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-75	5-30	---	NP
	23-65	Sand, fine sand, coarse sand.	SP, SM	A-1, A-2, A-3	0	95-100	65-100	30-75	3-30	---	NP
Du*. Dumps											
EeB-------------- Essex	0-3	Gravelly fine sandy loam.	SM	A-1, A-2	0-15	75-95	70-90	35-70	12-35	---	NP
	3-15	Sandy loam, loamy sand, gravelly loamy sand.	SM	A-1, A-2	0-15	70-95	60-90	30-70	12-35	---	NP
	15-29	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	0-15	70-95	60-85	30-65	5-25	---	NP
	29-65	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	0-15	70-95	60-85	30-65	5-25	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EsB, EsC: Essex	0-3	Gravelly fine sandy loam.	SM	A-1, A-2	10-20	70-90	60-85	30-65	12-35	---	NP
	3-15	Sandy loam, loamy sand, gravelly loamy sand.	SM	A-1, A-2	10-15	70-90	60-85	30-65	12-35	---	NP
	15-29	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	10-15	70-90	60-85	30-65	5-25	---	NP
	29-65	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	10-15	70-90	60-85	30-65	5-25	---	NP
ExB, ExC, ExD: Essex	0-3	Gravelly fine sandy loam.	SM	A-1, A-2	15-35	65-90	55-85	25-65	12-35	---	NP
	3-15	Sandy loam, loamy sand, gravelly loamy sand.	SM	A-1, A-2	10-15	70-90	60-85	30-65	12-35	---	NP
	15-29	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	10-15	70-90	60-85	30-65	5-25	---	NP
	29-65	Loamy sand, loamy coarse sand, gravelly loamy sand.	SM, SW-SM	A-1, A-2	10-15	70-90	60-85	30-65	5-25	---	NP
Fm: Freetown	0-4	Sapric material	PT	A-8	---	---	---	---	---	---	---
	4-65	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
GfB: Gloucester	0-5	Gravelly fine sandy loam.	SM	A-1, A-2, A-4	0-15	80-95	70-90	35-75	15-45	<20	NP
	5-15	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-85	40-75	20-50	10-40	<10	NP
	15-65	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2	15-40	40-70	20-60	10-40	5-25	<10	NP
GhB, GhC: Gloucester	0-5	Gravelly fine sandy loam	SM, SW-SM	A-1, A-2, A-4	10-20	70-95	60-90	30-75	10-45	<20	NP
	5-15	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-75	40-75	20-50	10-40	<10	NP
	15-65	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2, A-3	15-40	40-70	20-60	10-40	5-25	<10	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
GxB, GxC, GxD---- Gloucester	0-5	Gravelly fine sandy loam	SM, SW-SM	A-1, A-2, A-4	15-35	60-90	55-90	25-75	10-45	<20	NP
	5-15	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-75	40-75	20-50	10-40	<10	NP
	15-65	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2, A-3	15-40	40-70	20-60	10-40	5-25	<10	NP
GyE*: Gloucester------	0-5	Gravelly fine sandy loam	SM, SW-SM	A-1, A-2, A-4	15-35	60-90	55-90	25-75	10-45	<20	NP
	5-15	Gravelly sandy loam, sandy loam, fine sandy loam.	SM, SW-SM	A-1, A-2, A-4	5-30	60-75	40-75	20-50	10-40	<10	NP
	15-65	Very gravelly loamy coarse sand, gravelly loamy sand, gravelly sandy loam.	SM, SW-SM, GM, GW-GM	A-1, A-2, A-3	15-40	40-70	20-60	10-40	5-25	<10	NP
Canton----------	0-7	Fine sandy loam	SM, ML	A-2, A-4	10-30	70-95	60-90	40-85	25-60	<15	NP-8
	7-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<12	NP-8
	26-65	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
HgA, HgB, HgC, HgD, HgE-------- Hinckley	0-3	Loamy sand-------	SM, SP-SM	A-1, A-2	0-5	85-95	75-90	35-75	10-35	<20	NP
	3-15	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	<20	NP
	15-65	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1, A-2	5-25	50-65	30-50	10-40	0-20	<10	NP
MeA, MeB, MeC---- Merrimac	0-5	Sandy loam-------	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	<20	NP
	5-18	Sandy loam-------	SM	A-2	0	75-95	70-90	40-60	20-35	<25	NP
	18-29	Gravelly loamy sand, sandy loam, gravelly sandy loam.	SP, SM, SP-SM	A-1, A-2, A-3	0	65-95	55-90	30-60	0-35	<25	NP
	29-65	Stratified sand to very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
MoB-------------- Montauk	0-6	Fine sandy loam	ML, SM, SM-SC, CL-ML	A-4, A-2, A-1	0-5	80-100	75-95	45-95	20-85	<20	NP-4
	6-24	Fine sandy loam, gravelly sandy loam.	SM, ML, SM-SC, CL-ML	A-2, A-4, A-1	0-15	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-2, A-1, A-4	0-15	60-100	55-95	20-80	10-50	<15	NP-2
MsB, MsC, MsD---- Montauk	0-6	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-1, A-2, A-4	5-15	65-80	60-75	30-75	15-70	<20	NP-4
	6-24	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML, SM-SC, CL-ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-100	55-95	20-80	10-50	<15	NP-2
MxB, MxC, MxD---- Montauk	0-6	Fine sandy loam	SM, ML, GM, CL-ML	A-2, A-4, A-1	10-30	65-80	55-75	30-75	15-70	<20	NP-4
	6-24	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML, SM-SC, CL-ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-100	55-95	20-80	10-50	<15	NP-2
PaB, PaC--------- Paxton	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<40	NP-10
	8-28	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-7
PbB, PbC--------- Paxton	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	5-20	80-95	75-90	60-85	30-65	<40	NP-10
	8-28	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-7
PcB, PcC, PcD---- Paxton	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	10-25	80-90	70-85	60-80	30-65	<40	NP-10
	8-28	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-7

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PeE*:											
Paxton----------	0-8	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	10-25	80-90	70-85	60-80	30-65	<40	NP-10
	8-28	Fine sandy loam, loam; gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-7
Montauk---------	0-6	Fine sandy loam	SM, ML, GM, CL-ML	A-2, A-4, A-1	10-30	65-80	55-75	30-75	15-70	<20	NP-4
	6-24	Fine sandy loam, silt loam, gravelly sandy loam.	SM, ML, SM-SC, CL-ML	A-1, A-2, A-4	0-5	60-100	55-95	35-90	15-80	<20	NP-4
	24-65	Sandy loam, loamy sand, gravelly sandy loam.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-4	0-5	60-100	55-95	20-80	10-50	<15	NP-2
Pg*. Pits											
Pv--------------- Pootatuck	0-12	Fine sandy loam	SM, ML	A-2, A-4	0	95-100	80-100	55-95	30-75	<25	NP-4
	12-32	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	95-100	80-100	55-85	30-50	<20	NP-2
	32-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0-15	70-100	45-100	25-75	0-25	---	NP
RdB-------------- Ridgebury	0-5	Fine sandy loam	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	5-18	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	18-65	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
ReA, ReB--------- Ridgebury	0-5	Fine sandy loam	SM, ML	A-2, A-4	10-30	70-100	50-85	30-80	15-65	---	NP
	5-18	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	18-65	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
Rm--------------- Rippowam	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	95-100	80-100	55-95	30-75	<25	NP-4
	7-22	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	95-100	80-100	55-85	30-50	<20	NP-2
	22-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0	70-100	45-100	25-75	0-25	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sb*:											
Scarboro--------	0-10	Mucky fine sandy loam.	SM, SP-SM	A-1, A-2, A-3, A-4	0	95-100	85-100	45-85	5-50	---	NP
	10-16	Loamy sand, fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	85-100	45-80	5-35	---	NP
	16-65	Stratified loamy fine sand to gravelly coarse sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	70-100	35-100	15-80	0-35	---	NP
Rippowam--------	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	95-100	80-100	55-95	30-75	<25	NP-4
	7-22	Fine sandy loam, sandy loam.	SM	A-2, A-4	0	95-100	80-100	55-85	30-50	<20	NP-2
	22-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0	70-100	45-100	25-75	0-25	---	NP
SgB, SgC--------- Scituate	0-5	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	80-95	70-90	40-85	20-65	<20	NP-4
	5-27	Fine sandy loam, sandy loam, loam.	SM, ML	A-2, A-4, A-1	0-25	70-95	60-90	35-85	20-65	<20	NP-4
	27-65	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-25	65-85	50-75	30-65	12-30	<15	NP-2
ShB, ShC--------- Scituate	0-5	Fine sandy loam	SM, ML	A-2, A-4, A-1	10-20	70-90	60-85	35-80	20-65	<20	NP-4
	5-27	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4, A-1	0-25	70-95	60-90	35-85	20-65	<20	NP-4
	27-65	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-25	65-85	50-75	30-65	12-30	<15	NP-2
StB, StC, StD---- Scituate	0-5	Fine sandy loam	SM, ML	A-2, A-4, A-1	15-35	60-90	55-85	35-80	20-65	<20	NP-4
	5-27	Fine sandy loam, loam, sandy loam.	SM, ML	A-2, A-4, A-1	0-25	70-95	60-90	35-85	20-65	<20	NP-4
	27-65	Loamy sand, gravelly loamy fine sand, gravelly loamy coarse sand.	SM	A-1, A-2	0-25	65-85	50-75	30-65	12-30	<15	NP-2
SuA, SuB--------- Sudbury	0-10	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
	10-17	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0-5	85-100	60-100	40-80	20-50	---	NP
	17-23	Gravelly coarse sand, loamy sand, sandy loam.	SM, SP-SM	A-1, A-2, A-3	0-5	70-100	60-100	30-70	5-35	---	NP
	23-65	Stratified sand and gravel.	SP, SP-SM, GP, GP-GM	A-1	10-40	35-70	25-65	15-45	0-10	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sw-------------- Swansea	0-8	Sapric material	PT	A-8	---	---	---	---	---	---	---
	8-48	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
	48-65	Sand, loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	55-100	45-100	30-70	5-30	---	NP
Wa-------------- Walpole	0-3	Fine sandy loam	SM, ML	A-2, A-4	0-5	90-100	75-100	55-90	25-60	<25	NP-3
	3-23	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-85	20-50	---	NP
	23-65	Stratified loamy fine sand to very gravelly coarse sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-20	55-100	50-100	25-80	2-30	---	NP
Wh-------------- Whitman	0-8	Fine sandy loam	ML, SM, CL-ML	A-1, A-2, A-4	10-40	65-80	60-75	35-70	20-65	16-35	NP-10
	8-20	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	20-65	Sandy loam, gravelly fine sandy loam, loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
WnB, WnC, WnD---- Windsor	0-9	Loamy sand-------	SM	A-1, A-2	0	95-100	80-100	45-90	20-35	---	NP
	9-18	Loamy sand, loamy fine sand.	SM	A-1, A-2	0	95-100	80-100	45-90	15-30	---	NP
	18-65	Sand, fine sand, loamy sand.	SM, SP, SP-SM	A-1, A-2, A-3	0	90-100	75-100	40-90	2-30	---	NP
WsB------------- Woodbridge	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	5-20	85-95	70-90	60-85	30-65	<40	NP-10
	9-28	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	75-95	65-90	50-85	25-60	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-90	50-75	25-60	<30	NP-7
WtB, WtC, WtD---- Woodbridge	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	10-25	85-95	70-90	60-85	30-65	<40	NP-10
	9-28	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	75-95	65-90	50-85	25-60	<30	NP-7
	28-65	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-90	50-75	25-60	<30	NP-7

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
BoB, BoC, BoD----	0-2	2-10	1.00-1.25	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.20	3	---
Brookfield	2-65	1-6	1.40-1.65	0.6-6.0	0.05-0.14	4.5-6.0	Low----------	0.24		
BrC*, BrE*:										
Brookfield------	0-2	2-10	1.00-1.25	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.20	3	---
	2-65	1-6	1.40-1.65	0.6-6.0	0.05-0.14	4.5-6.0	Low----------	0.24		
Brimfield-------	0-2	3-10	1.10-1.35	0.6-6.0	0.08-0.17	4.5-6.0	Low----------	0.17	1	---
	2-15	3-10	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low----------	0.32		
	15	---	---	---	---	---	-------------	----		
Rock outcrop.										
CaB, CaC---------	0-7	1-8	0.90-1.20	2.0-6.0	0.13-0.20	3.6-5.5	Low----------	0.20	3	---
Canton	7-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-5.5	Low----------	0.28		
	26-65	0-5	1.30-1.60	6.0-20	0.04-0.08	3.6-5.5	Low----------	0.17		
CcB, CcC, CcD----	0-7	1-8	0.90-1.20	2.0-6.0	0.13-0.17	3.6-5.5	Low----------	0.20	3	---
Canton	7-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-5.5	Low----------	0.28		
	26-65	0-5	1.30-1.60	6.0-20	0.04-0.08	3.6-5.5	Low----------	0.17		
CmB--------------	0-2	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
Charlton	2-25	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low----------	0.24		
	25-65	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low----------	0.24		
CnB, CnC, CnD----	0-2	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
Charlton	2-25	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low----------	0.24		
	25-65	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low----------	0.24		
CrC*, CrE*:										
Charlton--------	0-2	3-8	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
	2-25	3-8	1.40-1.65	0.6-6.0	0.07-0.20	4.5-6.0	Low----------	0.24		
	25-65	1-8	1.45-1.70	0.6-6.0	0.05-0.16	4.5-6.0	Low----------	0.24		
Hollis----------	0-2	3-10	1.10-1.40	0.6-6.0	0.08-0.17	4.5-6.0	Low----------	0.17	1	---
	2-16	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low----------	0.32		
	16	---	---	---	---	---	-------------	----		
Rock outcrop.										
De---------------	0-6	2-7	1.00-1.20	6.0-20	0.07-0.13	4.5-6.5	Low----------	0.17	5	1-4
Deerfield	6-23	1-7	1.20-1.45	6.0-20	0.01-0.13	4.5-6.5	Low----------	0.17		
	23-65	0-5	1.40-1.50	>6.0	0.01-0.08	4.5-6.5	Low----------	0.17		
Du*.										
Dumps										
EeB--------------	0-3	3-8	1.00-1.30	2.0-20.0	0.08-0.14	3.6-6.0	Low----------	0.17	3	2-5
Essex	3-15	3-8	1.30-1.60	2.0-20.0	0.06-0.12	3.6-6.0	Low----------	0.17		
	15-29	1-5	1.30-1.60	6.0-20.0	0.05-0.09	3.6-6.0	Low----------	0.17		
	29-65	1-5	1.70-1.90	0.2-0.6	0.01-0.02	3.6-6.0	Low----------	0.17		
EsB, EsC---------	0-3	3-8	1.00-1.30	2.0-20.0	0.07-0.13	3.6-6.0	Low----------	0.17	3	---
Essex	3-15	3-8	1.30-1.60	2.0-20.0	0.06-0.11	3.6-6.0	Low----------	0.17		
	15-29	1-5	1.30-1.60	6.0-20.0	0.05-0.09	3.6-6.0	Low----------	0.17		
	29-65	1-5	1.70-1.90	0.2-0.6	0.01-0.02	3.6-6.0	Low----------	0.17		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
ExB, ExC, ExD---- Essex	0-3	3-8	1.00-1.30	2.0-20.0	0.07-0.13	3.6-6.0	Low----------	0.17	3	---
	3-15	3-8	1.30-1.60	2.0-20.0	0.06-0.11	3.6-6.0	Low----------	0.17		
	15-29	1-5	1.30-1.60	6.0-20.0	0.05-0.09	3.6-6.0	Low----------	0.17		
	29-65	1-5	1.70-1.90	0.2-0.6	0.01-0.02	3.6-6.0	Low----------	0.17		
Fm--------------- Freetown	0-4	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	>50
	4-65	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----		
GfB-------------- Gloucester	0-5	1-8	1.00-1.20	6.0-20	0.08-0.16	3.6-6.0	Low----------	0.24	3	.7-2
	5-15	1-8	1.20-1.50	6.0-20	0.06-0.10	3.6-6.0	Low----------	0.17		
	15-65	0-5	1.50-1.75	6.0-20	0.03-0.09	3.6-6.0	Low----------	0.17		
GhB, GhC--------- Gloucester	0-5	1-8	1.00-1.30	6.0-20	0.07-0.16	3.6-6.0	Low----------	0.17	3	---
	5-15	1-8	1.20-1.50	6.0-20	0.06-0.10	3.6-6.0	Low----------	0.17		
	15-65	0-5	1.50-1.75	6.0-20	0.03-0.08	3.6-6.0	Low----------	0.17		
GxB, GxC, GxD---- Gloucester	0-5	1-8	1.00-1.30	6.0-20	0.07-0.16	3.6-6.0	Low----------	0.17	3	---
	5-15	1-8	1.20-1.50	6.0-20	0.06-0.10	3.6-6.0	Low----------	0.17		
	15-65	0-5	1.50-1.75	6.0-20	0.03-0.08	3.6-6.0	Low----------	0.17		
GyE*:										
Gloucester------	0-5	1-8	1.00-1.30	6.0-20	0.07-0.16	3.6-6.0	Low----------	0.17	3	---
	5-15	1-8	1.20-1.50	6.0-20	0.06-0.10	3.6-6.0	Low----------	0.17		
	15-65	0-5	1.50-1.75	6.0-20	0.03-0.08	3.6-6.0	Low----------	0.17		
Canton----------	0-7	1-8	0.90-1.20	2.0-6.0	0.13-0.17	3.6-6.0	Low----------	0.20	3	---
	7-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28		
	26-65	0-5	1.30-1.60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17		
HgA, HgB, HgC, HgD, HgE-------- Hinckley	0-3	4-8	1.00-1.20	6.0-20	0.09-0.13	3.6-6.0	Low----------	0.17	3	2-7
	3-15	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low----------	0.17		
	15-65	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low----------	0.10		
MeA, MeB, MeC---- Merrimac	0-5	3-7	1.10-1.20	2.0-6.0	0.14-0.19	3.6-6.0	Low----------	0.24	3	1-5
	5-18	1-4	1.20-1.40	2.0-6.0	0.14-0.17	3.6-6.0	Low----------	0.24		
	18-29	1-3	1.20-1.40	2.0-20.0	0.03-0.12	3.6-6.0	Low----------	0.17		
	29-65	0-3	1.30-1.50	6.0-20	0.01-0.06	3.6-6.0	Low----------	0.10		
MoB-------------- Montauk	0-6	6-18	1.00-1.25	0.6-6.0	0.16-0.20	3.6-6.0	Low----------	0.32	3	2-6
	6-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low----------	0.24		
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low----------	0.24		
MsB, MsC, MsD---- Montauk	0-6	6-18	1.00-1.25	0.6-6.0	0.10-0.14	3.6-6.0	Low----------	0.24	3	---
	6-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low----------	0.24		
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low----------	0.24		
MxB, MxC, MxD---- Montauk	0-6	6-18	1.00-1.25	0.6-6.0	0.09-0.14	3.6-6.0	Low----------	0.24	3	---
	6-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-6.0	Low----------	0.24		
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-6.0	Low----------	0.24		
PaB, PaC--------- Paxton	0-8	3-12	1.00-1.25	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3	2-5
	8-28	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
PbB, PbC--------- Paxton	0-8	3-12	1.00-1.25	0.6-6.0	0.08-0.20	4.5-6.0	Low----------	0.20	3	---
	8-28	3-12	1.35-1.60	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
PcB, PcC, PcD----	0-8	3-12	1.00-1.25	0.6-6.0	0.05-0.15	4.5-6.0	Low----------	0.20	3	---
Paxton	8-28	3-12	1.35-1.60	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
PeE*:										
Paxton----------	0-8	3-12	1.00-1.25	0.6-6.0	0.05-0.15	4.5-6.0	Low----------	0.20	3	---
	8-28	3-12	1.35-1.60	0.6-6.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
Montauk---------	0-6	6-18	1.00-1.25	0.6-6.0	0.09-0.14	3.6-5.5	Low----------	0.24	3	---
	6-24	6-18	1.30-1.60	0.6-6.0	0.10-0.16	3.6-5.5	Low----------	0.24		
	24-65	1-18	1.70-1.90	0.06-0.6	0.02-0.08	3.6-5.5	Low----------	0.24		
Pg*. Pits										
Pv---------------	0-12	2-6	1.10-1.35	0.6-6.0	0.11-0.21	4.5-6.5	Low----------	0.20	5	2-6
Pootatuck	12-32	1-6	1.20-1.45	0.6-6.0	0.09-0.18	4.5-6.5	Low----------	0.20		
	32-65	0-2	1.25-1.50	>6.0	0.01-0.10	4.5-6.5	Low----------	0.17		
RdB--------------	0-5	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.0	Low----------	0.24	3	4-7
Ridgebury	5-18	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.0	Low----------	0.32		
	18-65	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.0	Low----------	0.24		
ReA, ReB---------	0-5	3-10	1.00-1.30	0.6-6.0	0.06-0.21	4.5-6.0	Low----------	0.20	3	---
Ridgebury	5-18	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.0	Low----------	0.32		
	18-65	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.0	Low----------	0.24		
Rm---------------	0-7	2-6	1.10-1.35	0.6-6.0	0.11-0.21	4.5-7.3	Low----------	0.20	5	3-8
Rippowam	7-22	1-6	1.20-1.45	0.6-6.0	0.09-0.18	4.5-7.3	Low----------	0.20		
	22-65	0-2	1.25-1.50	>6.0	0.01-0.10	4.5-7.3	Low----------	0.17		
Sb*:										
Scarboro--------	0-10	1-7	0.70-1.00	>6.0	0.10-0.23	4.5-6.0	Low----------	0.17	5	---
	10-16	1-5	1.15-1.35	>6.0	0.04-0.13	4.5-6.5	Low----------	0.17		
	16-65	0-2	1.35-1.55	>6.0	0.01-0.13	4.5-6.5	Low----------	0.10		
Rippowam--------	0-7	2-6	1.10-1.35	0.6-6.0	0.11-0.21	4.5-7.3	Low----------	0.20	5	3-8
	7-22	1-6	1.20-1.45	0.6-6.0	0.09-0.18	4.5-7.3	Low----------	0.20		
	22-65	0-2	1.25-1.50	>6.0	0.01-0.10	4.5-7.3	Low----------	0.17		
SgB, SgC---------	0-5	4-10	1.00-1.30	0.6-2.0	0.11-0.21	3.6-6.0	Low----------	0.24	3	2-6
Scituate	5-27	2-9	1.25-1.50	0.6-2.0	0.09-0.16	4.5-6.0	Low----------	0.24		
	27-65	2-9	1.75-2.00	0.06-0.2	0.01-0.07	4.5-6.0	Low----------	0.24		
ShB, ShC---------	0-5	4-10	1.00-1.30	0.6-2.0	0.09-0.18	3.6-6.0	Low----------	0.17	3	---
Scituate	5-27	2-9	1.25-1.50	0.6-2.0	0.09-0.16	4.5-6.0	Low----------	0.24		
	27-65	2-5	1.75-2.00	0.06-0.2	0.01-0.07	4.5-6.0	Low----------	0.24		
StB, StC, StD----	0-5	4-10	1.00-1.30	0.6-2.0	0.08-0.15	3.6-6.0	Low----------	0.17	3	---
Scituate	5-27	2-9	1.25-1.50	0.6-2.0	0.09-0.16	4.5-6.0	Low----------	0.24		
	27-65	2-5	1.75-2.00	0.06-0.2	0.01-0.07	4.5-6.0	Low----------	0.24		
SuA, SuB---------	0-10	2-6	1.10-1.40	2.0-6.0	0.10-0.25	3.6-6.0	Low----------	0.24	3	2-6
Sudbury	10-17	2-7	1.15-1.45	2.0-6.0	0.07-0.18	3.6-6.0	Low----------	0.24		
	17-23	0-4	1.25-1.45	2.0-20	0.01-0.15	3.6-6.0	Low----------	0.17		
	23-65	0-3	1.30-1.45	6.0-20	0.01-0.06	3.6-6.0	Low----------	0.10		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Sw---------------- Swansea	0-8	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	>50
	8-48	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----		
	48-65	1-5	1.15-1.40	>20	0.01-0.08	3.6-5.5	Low----------	0.10		
Wa---------------- Walpole	0-3	2-6	1.00-1.25	2.0-6.0	0.10-0.18	4.5-6.0	Low----------	0.20	3	2-8
	3-23	2-6	1.30-1.55	2.0-6.0	0.07-0.15	4.5-6.0	Low----------	0.24		
	23-65	0-2	1.40-1.65	>6.0	0.01-0.10	4.5-6.0	Low----------	0.10		
Wh---------------- Whitman	0-8	5-8	1.10-1.30	0.6-6.0	0.12-0.26	4.5-6.5	Low----------	0.20	3	---
	8-20	2-4	1.60-1.85	0.6-6.0	0.10-0.17	4.5-6.5	Low----------	0.32		
	20-65	1-3	1.85-2.00	<0.2	0.03-0.04	4.5-6.5	Low----------	0.24		
WnB, WnC, WnD---- Windsor	0-9	1-3	1.00-1.20	>6.0	0.09-0.12	4.5-6.0	Low----------	0.17	5	2-4
	9-18	0-3	1.30-1.55	>6.0	0.07-0.10	4.5-6.0	Low----------	0.17		
	18-65	0-2	1.40-1.65	>6.0	0.04-0.10	4.5-6.5	Low----------	0.10		
WsB--------------- Woodbridge	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.20	4.5-6.0	Low----------	0.20	3	---
	9-28	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
WtB, WtC, WtD---- Woodbridge	0-9	3-12	1.00-1.25	0.6-2.0	0.05-0.15	4.5-6.0	Low----------	0.20	3	---
	9-28	3-12	1.35-1.60	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.32		
	28-65	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
BoB, BoC, BoD----- Brookfield	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
BrC*, BrE*:													
Brookfield-------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
Brimfield--------	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	---	---	Low------	High.
Rock outcrop.													
CaB, CaC, CcB, CcC, CcD--------- Canton	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
CmB, CnB, CnC, CnD-------------- Charlton	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
CrC*, CrE*:													
Charlton---------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
Hollis-----------	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	---	---	Low------	High.
Rock outcrop.													
De--------------- Deerfield	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	---	---	Low------	High.
Du*. Dumps													
EeB, EsB, EsC, ExB, ExC, ExD---- Essex	C	None--------	---	---	1.5-2.0	Perched	Nov-Mar	>60	---	---	---	Low------	High.
Fm--------------- Freetown	D	None--------	---	---	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High-----	High.
GfB, GhB, GhC, GxB, GxC, GxD---- Gloucester	A	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
GyE*:													
Gloucester-------	A	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
					Ft			In		In			
GyE*:													
Canton----------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
HgA, HgB, HgC, HgD, HgE--------- Hinckley	A	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
MeA, MeB, MeC----- Merrimac	A	None--------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
MoB, MsB, MsC, MsD, MxB, MxC, MxD-------------- Montauk	C	None--------	---	---	2.0-2.5	Perched	Feb-May	>60	---	---	---	Low------	High.
PaB, PaC, PbB, PbC, PcB, PcC, PcD-------------- Paxton	C	None--------	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	---	---	Low------	Moderate.
PeE*:													
Paxton-----------	C	None--------	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	---	---	Low------	Moderate.
Montauk----------	C	None--------	---	---	2.0-2.5	Perched	Feb-May	>60	---	---	---	Low------	High.
Pg*. Pits													
Pv---------------- Pootatuck	B	Frequent----	Brief-----	Nov-Apr	1.5-2.5	Apparent	Nov-Apr	>60	---	---	---	Moderate	Moderate.
RdB, ReA, ReB----- Ridgebury	C	None--------	---	---	0-1.5	Perched	Nov-May	>60	---	---	---	High-----	High.
Rm---------------- Rippowam	C	Frequent----	Brief-----	Oct-May	0-1.5	Apparent	Sep-Jun	>60	---	---	---	High-----	High.
Sb*:													
Scarboro---------	D	None--------	---	---	+1-1.0	Apparent	Jan-Dec	>60	---	---	---	High-----	High.
Rippowam---------	C	Frequent----	Brief-----	Oct-May	0-1.5	Apparent	Sep-Jun	>60	---	---	---	High-----	High.
SgB, SgC, ShB, ShC, StB, StC, StD-------------- Scituate	C	None--------	---	---	1.5-3.0	Perched	Nov-May	>60	---	---	---	Low------	High.
SuA, SuB---------- Sudbury	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	---	---	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
Sw----------------- Swansea	D	None---------	---	---	0-1.0	Apparent	Jan-Dec	>60	---	---	---	High-----	High.
Wa----------------- Walpole	C	None---------	---	---	0-1.0	Apparent	Nov-May	>60	---	---	---	Low------	Moderate.
Wh----------------- Whitman	D	None---------	---	---	+1-0.5	Perched	Sep-Jun	>60	---	---	---	High-----	High.
WnB, WnC, WnD------ Windsor	A	None---------	---	---	>6.0	---	---	>60	---	---	---	Low------	High.
WsB, WtB, WtC, WtD--------------- Woodbridge	C	None---------	---	---	1.5-2.5	Perched	Nov-May	>60	---	---	---	Low------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Brimfield	Loamy, mixed, mesic Lithic Dystrochrepts
Brookfield	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Canton	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Charlton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Deerfield	Mixed, mesic Aquic Udipsamments
Essex	Sandy, mixed, mesic Typic Dystrochrepts
Freetown	Dysic, mesic Typic Medisaprists
Gloucester	Sandy-skeletal, mixed, mesic Typic Dystrochrepts
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hollis	Loamy, mixed, mesic Lithic Dystrochrepts
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
Montauk	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Paxton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Pootatuck	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Ridgebury	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Rippowam	Coarse-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Scarboro	Sandy, mixed, mesic Histic Humaquepts
Scituate	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Sudbury	Sandy, mixed, mesic Aquic Dystrochrepts
Swansea	Sandy or sandy-skeletal, mixed, dysic, mesic Terric Medisaprists
Walpole	Sandy, mixed, mesic Aeric Haplaquepts
Whitman	Coarse-loamy, mixed, nonacid, mesic Typic Humaquepts
Windsor	Mixed, mesic Typic Udipsamments
Woodbridge	Coarse-loamy, mixed, mesic Aquic Dystrochrepts

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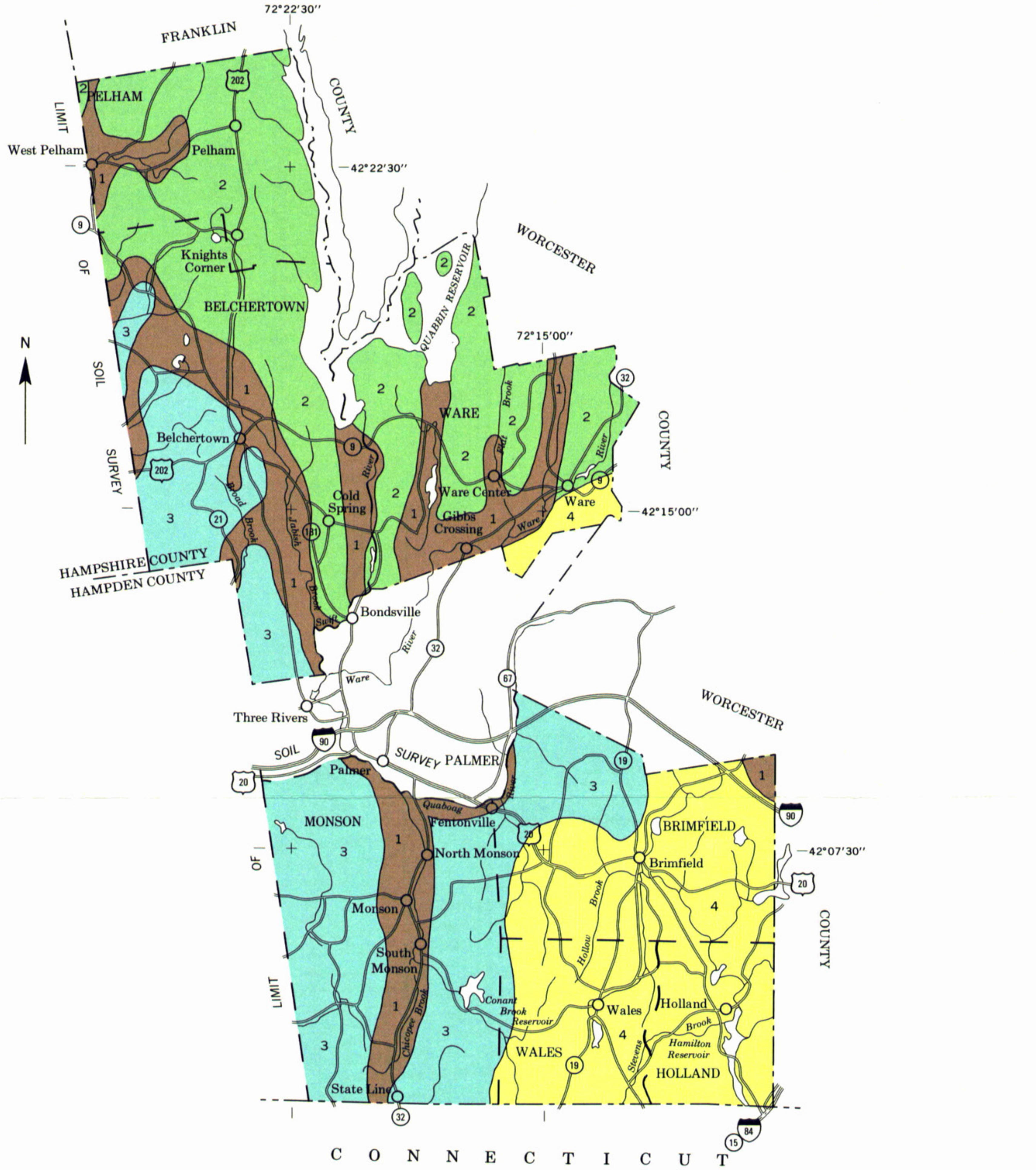
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



LEGEND

1 — HINCKLEY-MERRIMAC-WINDSOR: Very deep, nearly level to steep, excessively drained and somewhat excessively drained soils formed in sandy and gravelly outwash; on glacial outwash plains and terraces

2 — CANTON-GLOUCESTER-SCITUATE: Very deep, nearly level to steep, well drained, somewhat excessively drained, and moderately well drained soils formed in sandy glacial till; on uplands

3 — SCITUATE-MONTAUK-CHARLTON: Very deep, nearly level to very steep, well drained and moderately well drained soils formed in loamy and sandy glacial till; on uplands

4 — PAXTON-BROOKFIELD-WOODBRIDGE: Very deep, gently sloping to steep, well drained and moderately well drained soils formed in loamy glacial till; on uplands

COMPILED 1985

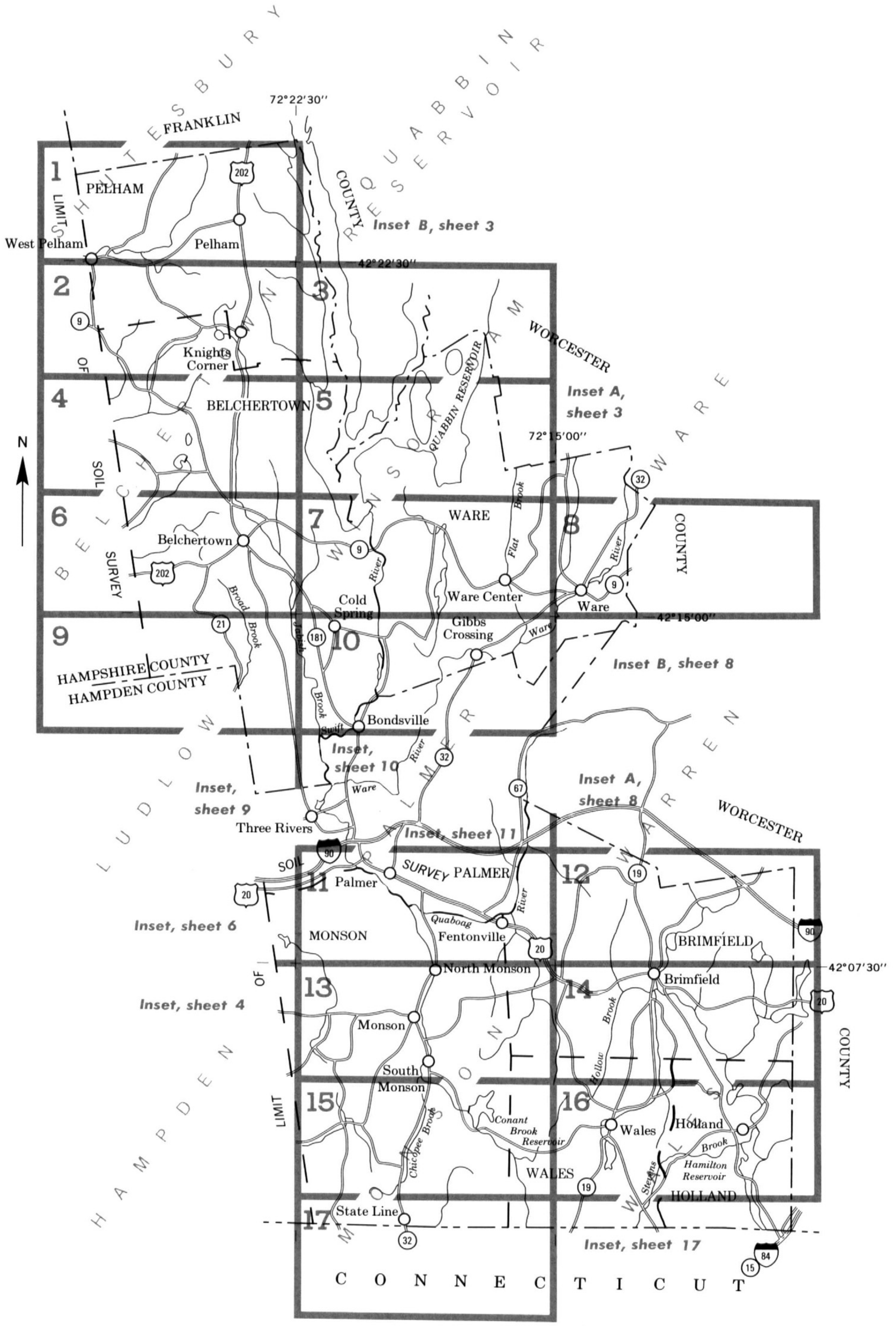
UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
HAMPDEN AND HAMPSHIRE COUNTIES
EASTERN PART
MASSACHUSETTS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



Original text from each individual map sheet read:

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey from 1976 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS
HAMPDEN AND HAMPSHIRE COUNTIES
EASTERN PART
MASSACHUSETTS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Publication symbols consist of letters (e.g. BoC, Fm, StD). The first letter, always a capital, is the initial letter of the soil name. The second letter is lower case and separates map units except that it does not separate slope phases. The third letter, always a capital; A, B, C, D or E indicates the slope. Symbols without a slope letter are for nearly level soils or for miscellaneous areas.

SYMBOL	NAME
BoB	Brookfield fine sandy loam, 3 to 8 percent slopes, extremely stony
BoC	Brookfield fine sandy loam, 8 to 15 percent slopes, extremely stony
BoD	Brookfield fine sandy loam, 15 to 25 percent slopes, extremely stony
BrC	Brookfield-Brimfield-Rock outcrop complex, strongly sloping
BrE	Brookfield-Brimfield-Rock outcrop complex, steep
CaB	Canton fine sandy loam, 3 to 8 percent slopes, very stony
CaC	Canton fine sandy loam, 8 to 15 percent slopes, very stony
CcB	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony
CcC	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony
CcD	Canton fine sandy loam, 15 to 25 percent slopes, extremely stony
CmB	Charlton fine sandy loam, 3 to 8 percent slopes, very stony
CnB	Charlton fine sandy loam, 3 to 8 percent slopes, extremely stony
CnC	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony
CnD	Charlton fine sandy loam, 15 to 25 percent slopes, extremely stony
CrC	Charlton-Hollis-Rock outcrop complex, strongly sloping
CrE	Charlton-Hollis-Rock outcrop complex, steep
De	Deerfield loamy fine sand
Du	Dumps, landfill
EeB	Essex gravelly fine sandy loam, 3 to 8 percent slopes
EsB	Essex gravelly fine sandy loam, 3 to 8 percent slopes, very stony
EsC	Essex gravelly fine sandy loam, 8 to 15 percent slopes, very stony
ExB	Essex gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony
ExC	Essex gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony
ExD	Essex gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony
Fm	Freetown muck
GfB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes
GhB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, very stony
GhC	Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, very stony
GxB	Gloucester gravelly fine sandy loam, 3 to 8 percent slopes, extremely stony
GxC	Gloucester gravelly fine sandy loam, 8 to 15 percent slopes, extremely stony
GxD	Gloucester gravelly fine sandy loam, 15 to 25 percent slopes, extremely stony
GyE	Gloucester and Canton soils, steep, extremely stony
HgA	Hinckley loamy sand, 0 to 3 percent slopes
HgB	Hinckley loamy sand, 3 to 8 percent slopes
HgC	Hinckley loamy sand, 8 to 15 percent slopes
HgD	Hinckley loamy sand, 15 to 25 percent slopes
HgE	Hinckley loamy sand, 25 to 35 percent slopes

SYMBOL	NAME
MeA	Merrimac sandy loam, 0 to 3 percent slopes
MeB	Merrimac sandy loam, 3 to 8 percent slopes
MeC	Merrimac sandy loam, 8 to 15 percent slopes
MoB	Montauk fine sandy loam, 3 to 8 percent slopes
MsB	Montauk fine sandy loam, 3 to 8 percent slopes, very stony
MsC	Montauk fine sandy loam, 8 to 15 percent slopes, very stony
MsD	Montauk fine sandy loam, 15 to 25 percent slopes, very stony
MxB	Montauk fine sandy loam, 3 to 8 percent slopes, extremely stony
MxC	Montauk fine sandy loam, 8 to 15 percent slopes, extremely stony
MxD	Montauk fine sandy loam, 15 to 25 percent slopes, extremely stony
PaB	Paxton fine sandy loam, 3 to 8 percent slopes
PaC	Paxton fine sandy loam, 8 to 15 percent slopes
PbB	Paxton fine sandy loam, 3 to 8 percent slopes, very stony
PbC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony
PcB	Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony
PcC	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony
PcD	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony
PeE	Paxton and Montauk fine sandy loams, steep, extremely stony
Pg	Pits, gravel
Pv	Pootatuck fine sandy loam
RdB	Ridgebury fine sandy loam, 0 to 6 percent slopes
ReA	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony
ReB	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
Rm	Rippowam fine sandy loam
Sb	Scarboro-Rippowam complex
SgB	Scituate fine sandy loam, 3 to 8 percent slopes
SgC	Scituate fine sandy loam, 8 to 15 percent slopes
ShB	Scituate fine sandy loam, 3 to 8 percent slopes, very stony
ShC	Scituate fine sandy loam, 8 to 15 percent slopes, very stony
StB	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony
StC	Scituate fine sandy loam, 8 to 15 percent slopes, extremely stony
StD	Scituate fine sandy loam, 15 to 25 percent slopes, extremely stony
SuA	Sudbury fine sandy loam, 0 to 3 percent slopes
SuB	Sudbury fine sandy loam, 3 to 8 percent slopes
Sw	Swansea muck
Wa	Walpole fine sandy loam
Wh	Whitman fine sandy loam, extremely stony
WnB	Windsor loamy sand, 3 to 8 percent slopes
WnC	Windsor loamy sand, 8 to 15 percent slopes
WnD	Windsor loamy sand, 15 to 25 percent slopes
WsB	Woodbridge fine sandy loam, 3 to 8 percent slopes, very stony
WtB	Woodbridge fine sandy loam, 3 to 8 percent slopes, extremely stony
WtC	Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony
WtD	Woodbridge fine sandy loam, 15 to 25 percent slopes, extremely stony
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CaC, WtC

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

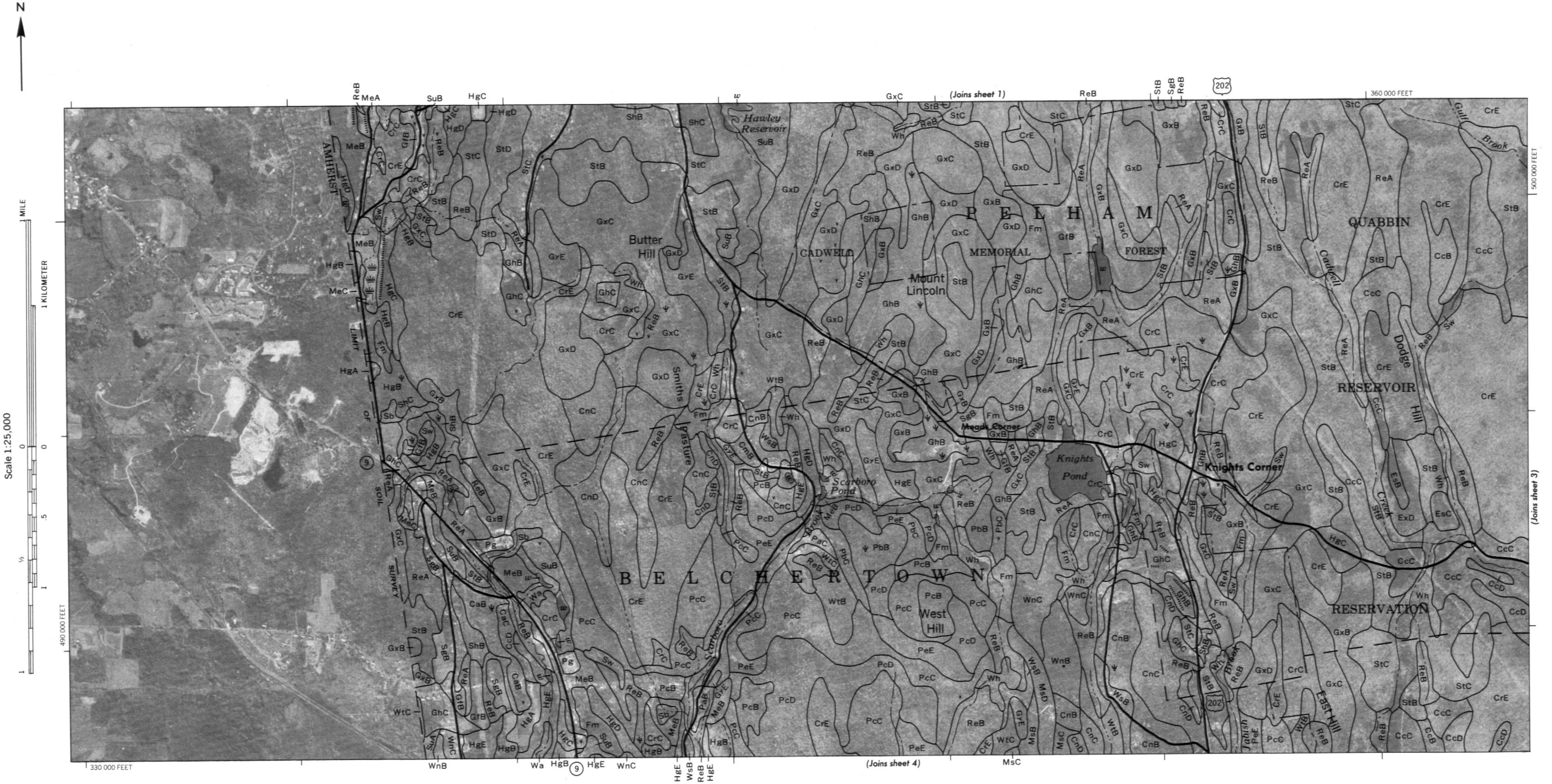
SOIL SAMPLE (normally not shown) — S

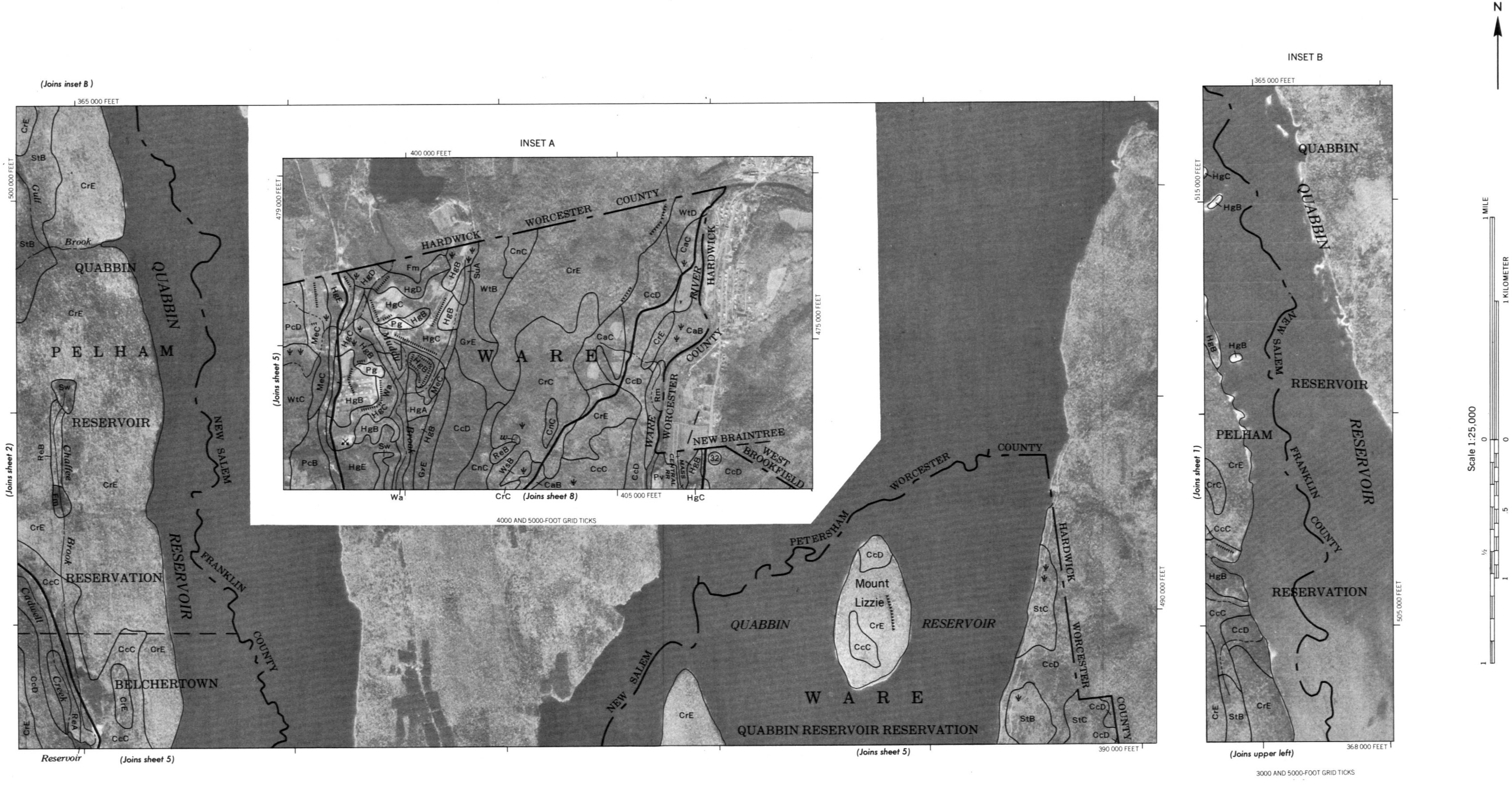
MISCELLANEOUS

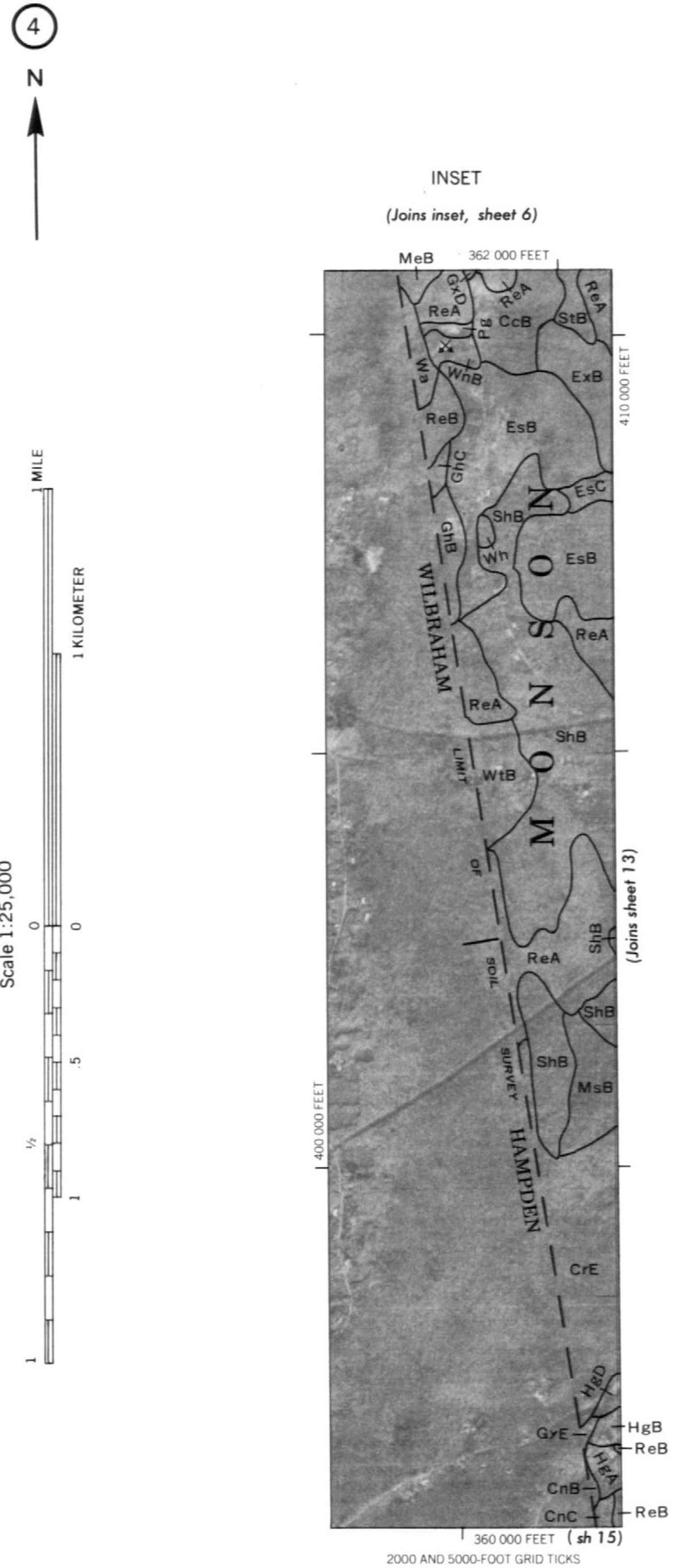
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Stripped land

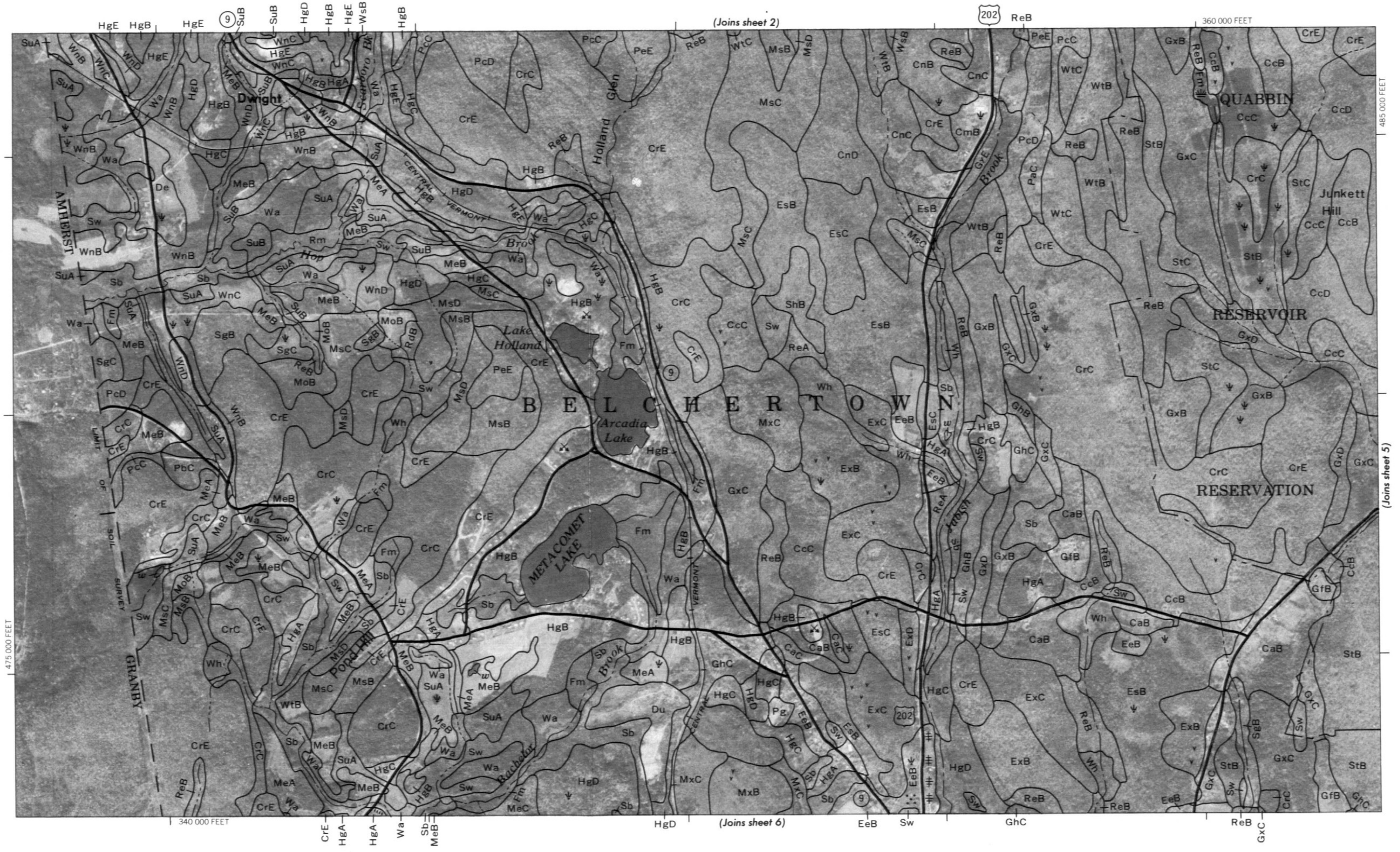

N
330 000 FEET
515 000 FEET
505 000 FEET
360 000 FEET
SHUTESBURY FRANKLIN COUNTY
SHUTESBURY
FRANKLIN COUNTY
Poverty Mountain
Mount Orient
P E L H A M
Pelham
West Pelham
QUABBIN
RESERVOIR
RESERVATION
Quabbin Reservoir
(Joins inset B, sheet 3)
(Joins sheet 2)
AMHERST SOIL SURVEY LIMIT
STATE RESERVOIR BOUNDARY
CADWELL MEMORIAL FOREST
Heatherstone Brook
Adams Brook
Gates Brook
Buffum Brook
Amethyst Brook
Orient Springs
Harris Brook
Hill Reservoir
Dunlop Brook
Briggs Brook
Purgee Brook
202
Scale 1:25,000
1 MILE
1 KILOMETER
ReB
GfB
HgD
StC
ReB
GxB
GxB
GxB

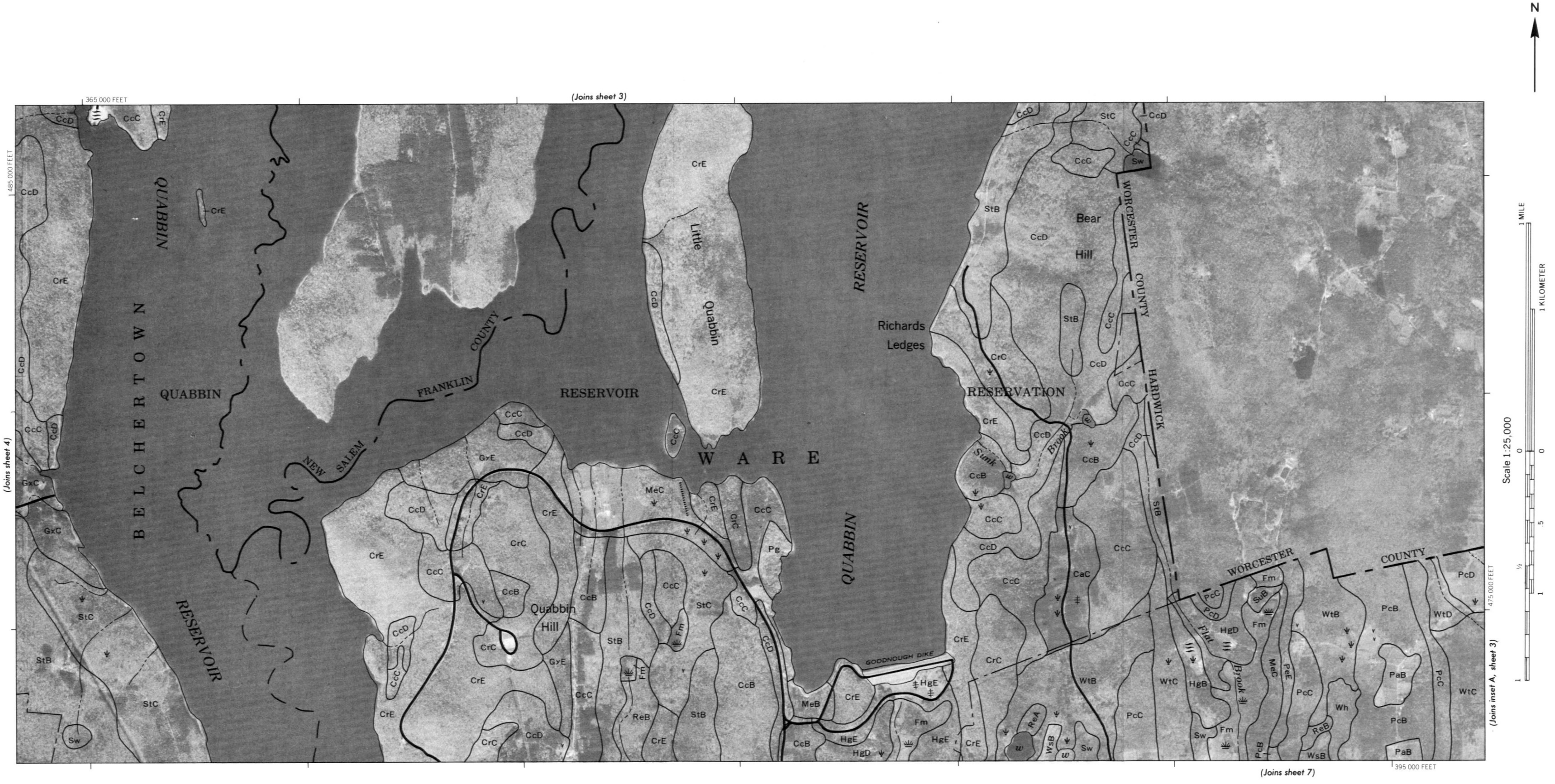
SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTY, MASSACHUSETTS EASTERN PART — SHEET NUMBER 2




N
INSET A
INSET B
(Joins inset B)
365 000 FEET
500 000 FEET
(Joins sheet 2)
(Joins sheet 5)
Reservoir
QUABBIN
PELHAM
RESERVOIR
RESERVATION
BELCHERTOWN
NEW SALEM
FRANKLIN
COUNTY
Gulf
Brook
Chaffee
Cadwell
Creek
400 000 FEET
479 000 FEET
475 000 FEET
405 000 FEET
(Joins sheet 5)
(Joins sheet 8)
HARDWICK
WORCESTER
COUNTY
WARE
RIVER
NEW BRAINTREE
WEST BROOKFIELD
CENTRAL MASS RR
Muddy
Brook
4000 AND 5000-FOOT GRID TICKS
PETERSHAM
Mount
Lizzie
QUABBIN
RESERVOIR
W A R E
QUABBIN RESERVOIR RESERVATION
490 000 FEET
390 000 FEET
515 000 FEET
505 000 FEET
368 000 FEET
(Joins sheet 1)
(Joins upper left)
3000 AND 5000-FOOT GRID TICKS
Scale 1:25,000
1 MILE
1 KILOMETER


4
N
Scale 1:25,000
1 MILE
1 KILOMETER
INSET
(Joins inset, sheet 6)
362 000 FEET
410 000 FEET
400 000 FEET
360 000 FEET
(sh 15)
(Joins sheet 13)
2000 AND 5000-FOOT GRID TICKS
WILBRAHAM
MONSON
HAMPDEN
LIMIT OF SOIL SURVEY


(Joins sheet 2)
(Joins sheet 5)
(Joins sheet 6)
360 000 FEET
485 000 FEET
475 000 FEET
340 000 FEET
BELCHERTOWN
AMHERST
GRANBY
Dwight
QUABBIN
RESERVOIR
RESERVATION
Junkett Hill
Lake Holland
Arcadia Lake
METACOMET LAKE
Holland Glen
Pond Hill
Hop Brook
Jabish Brook
CENTRAL VERMONT
LIMIT OF SOIL SURVEY


N
(Joins sheet 3)
365 000 FEET
485 000 FEET
(Joins sheet 4)
(Joins sheet 7)
395 000 FEET
475 000 FEET
(Joins inset A, sheet 3)
QUABBIN
BELCHERTOWN
QUABBIN
RESERVOIR
FRANKLIN COUNTY
NEW SALEM
RESERVOIR
WARE
Little Quabbin
RESERVOIR
QUABBIN
Richards Ledges
RESERVATION
Bear Hill
WORCESTER COUNTY
HARDWICK
WORCESTER COUNTY
Quabbin Hill
GOODNOUGH DIKE
Sunk Brook
Flat Brook
Scale 1:25,000
1 MILE
1 KILOMETER

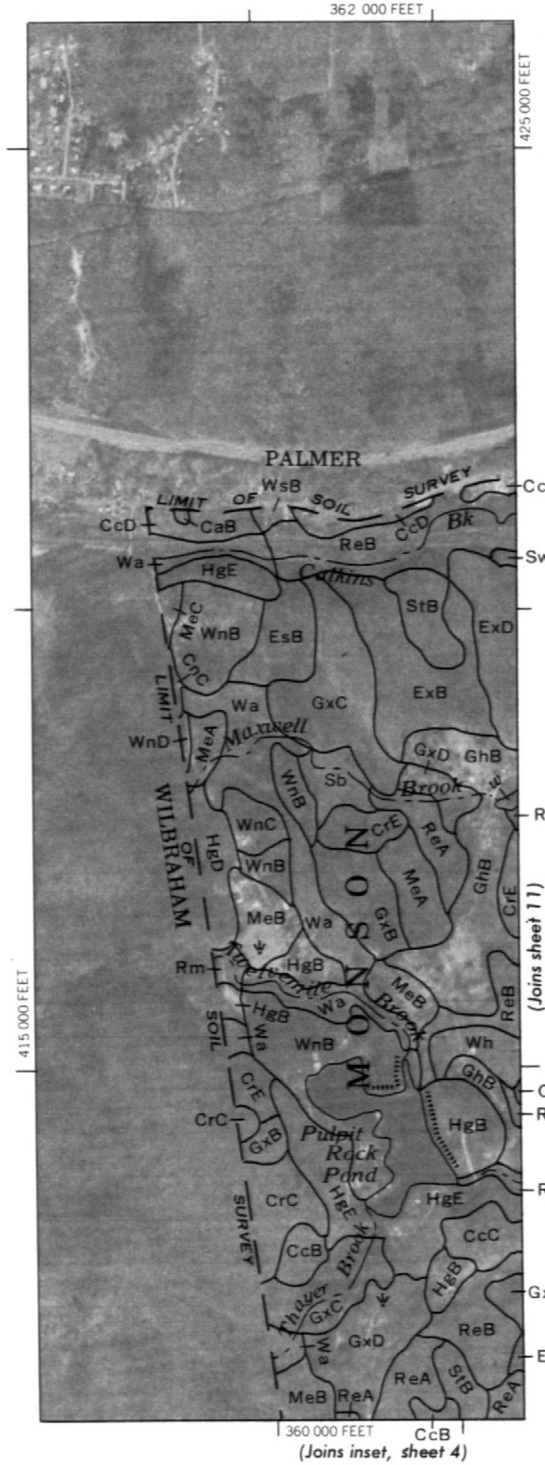
N

Scale 1:25,000

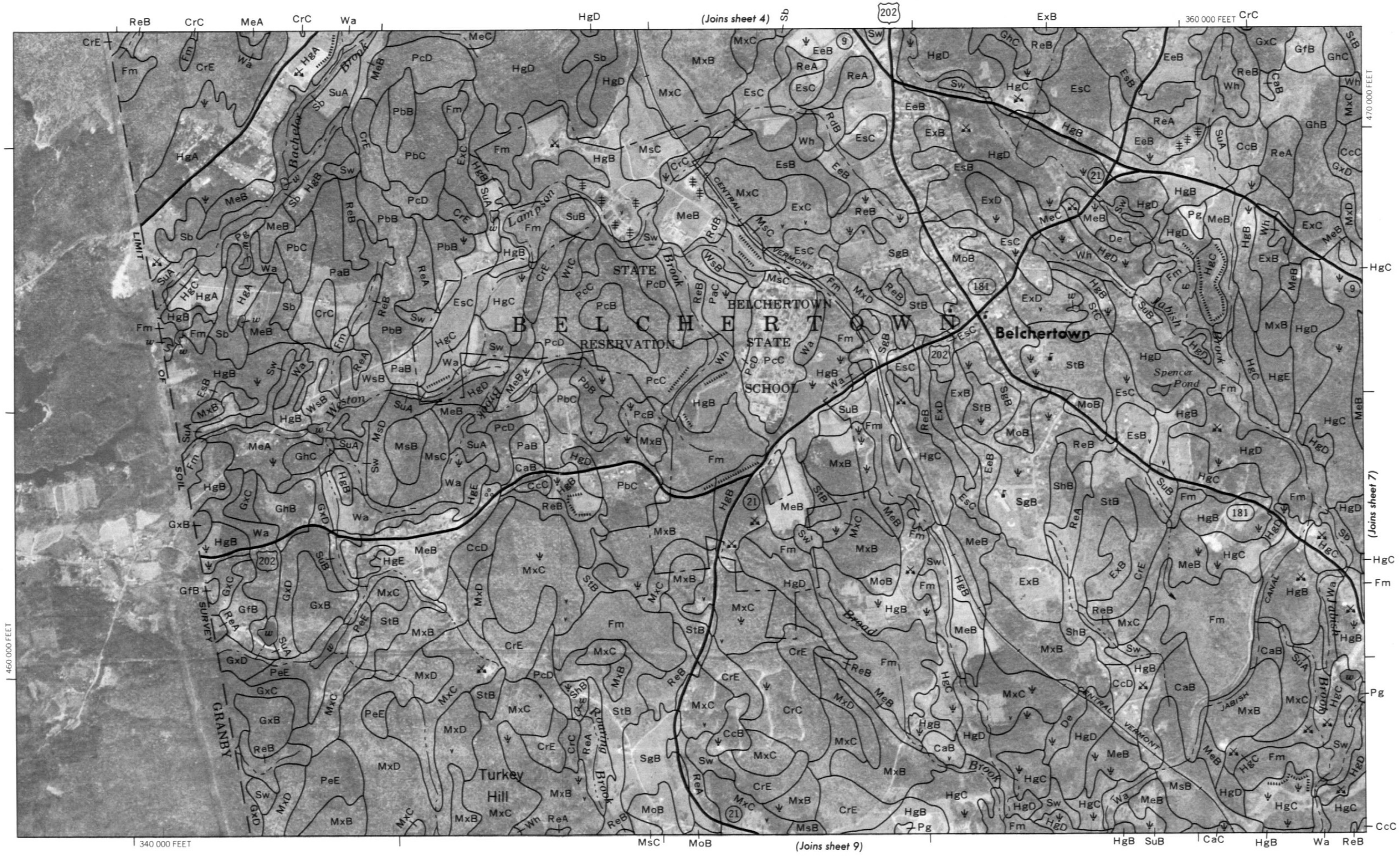
1 MILE

1 KILOMETER

INSET



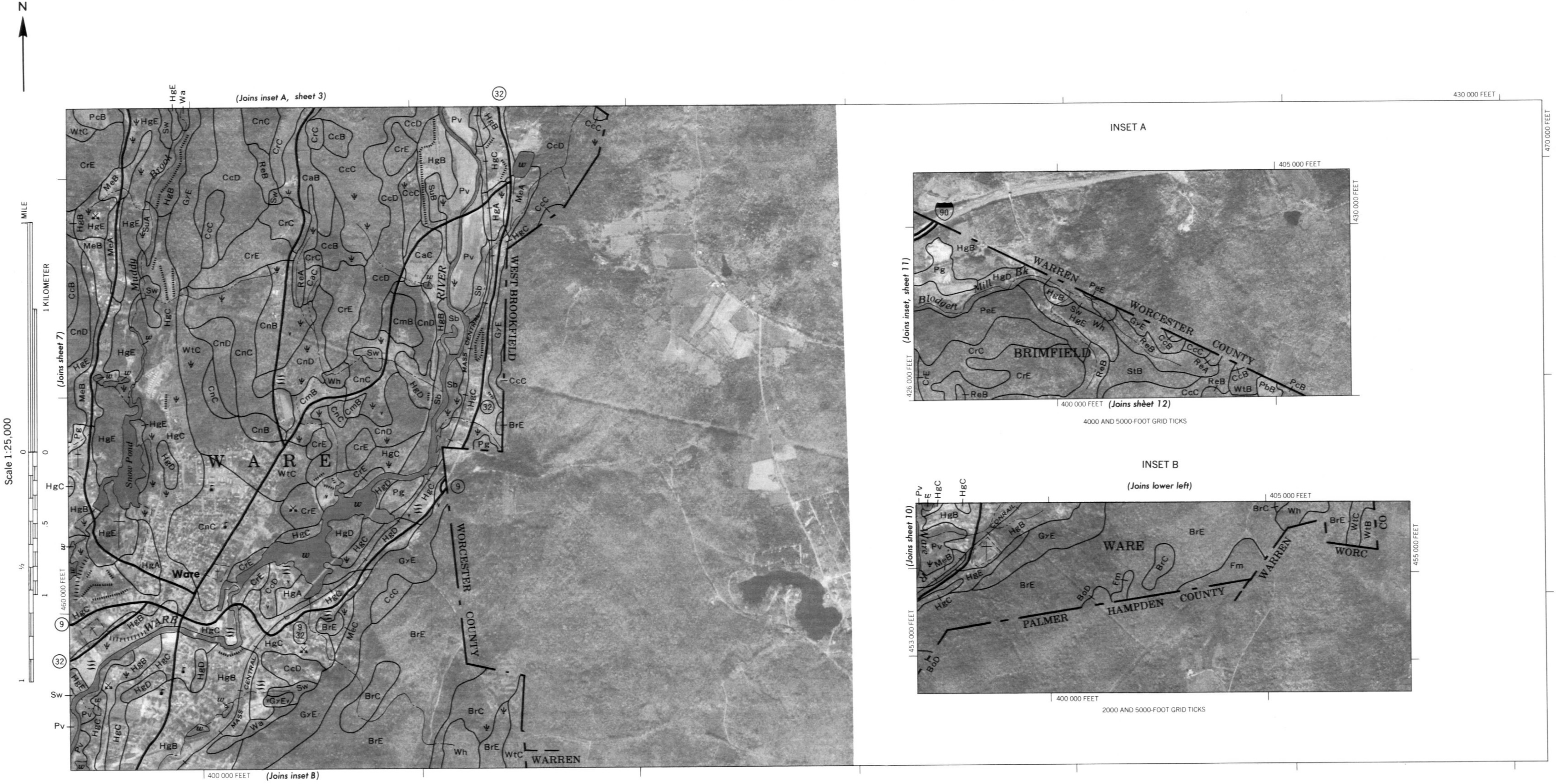
2000 AND 5000-FOOT GRID TICKS



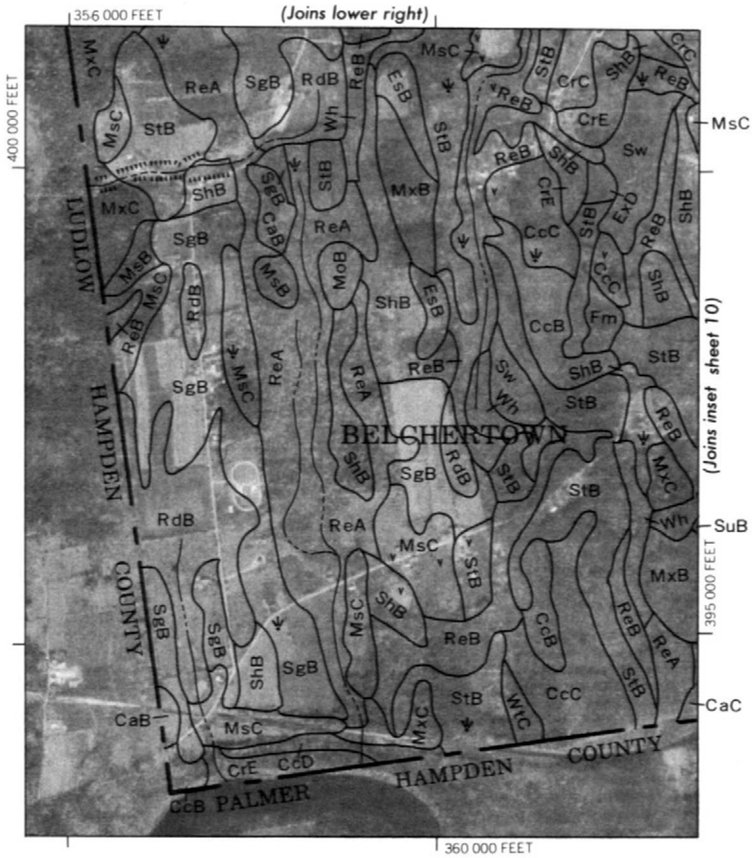
7

N

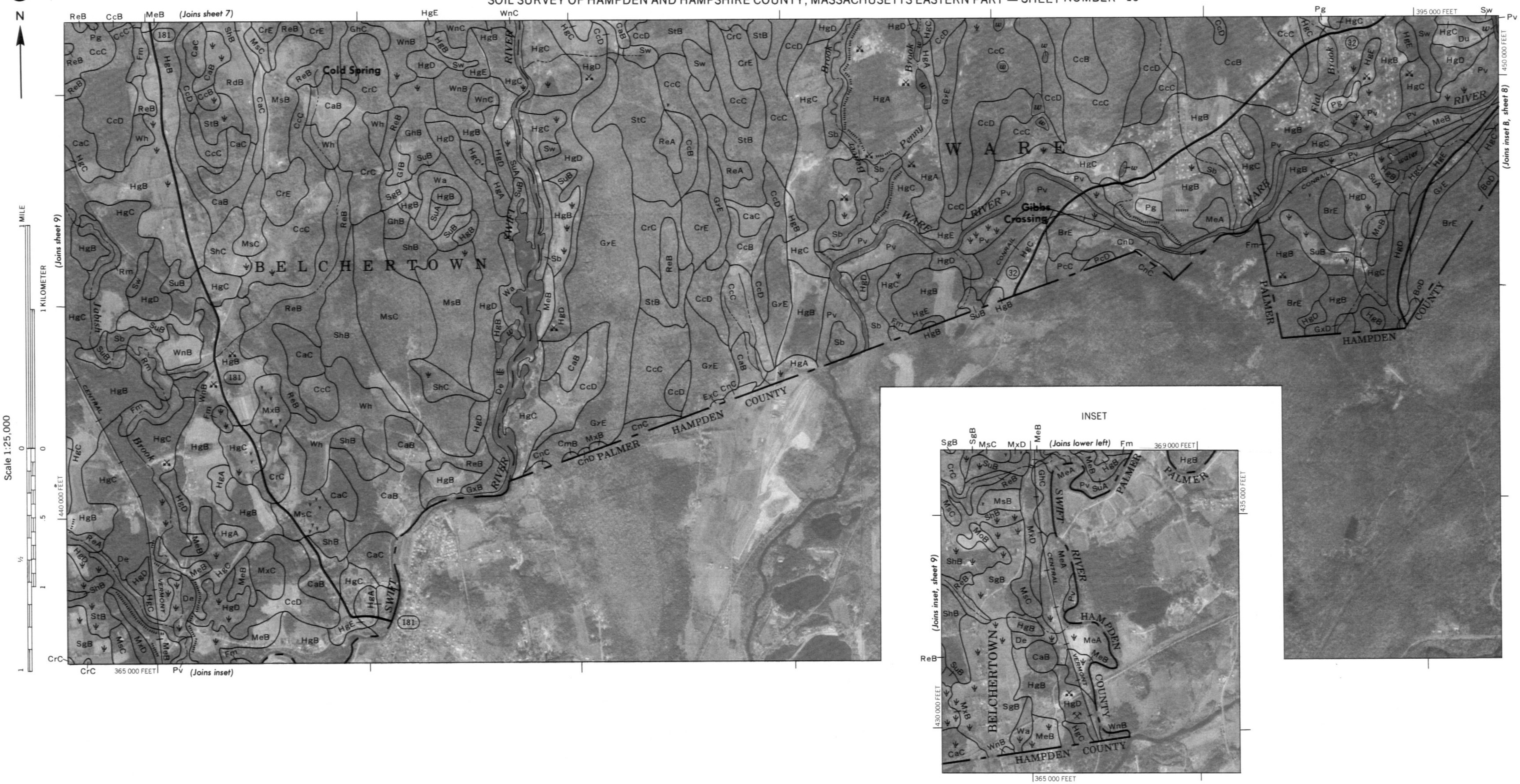

QUABBIN RESERVOIR
QUABBIN RESERVOIR RESERVATION
WINSOR DAM
Peppers Mill Pond
Brimstone Hill
BELCHERTOWN
WARE
West Ware
Ware Center
Ware
SWIFT RIVER
SWIFT RIVER WILDLIFE MANAGEMENT AREA
BEAVER LAKE
Beaver Brook
King Brook
Flat Brook
Muddy Brook
(Joins sheet 5)
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 10)
365 000 FEET
395 000 FEET
470 000 FEET
460 000 FEET
Scale 1:25,000
1 MILE
1 KILOMETER


N
Scale 1:25,000
MILE
1 KILOMETER
(Joins inset A, sheet 3)
(Joins sheet 7)
(Joins inset B)
400 000 FEET
430 000 FEET
460 000 FEET
470 000 FEET
W A R E
Ware
Snow Pond
Muddy Brook
WARE
RIVER
WEST BROOKFIELD
WORCESTER COUNTY
WARREN
INSET A
405 000 FEET
430 000 FEET
426 000 FEET
400 000 FEET
(Joins inset, sheet 11)
(Joins sheet 12)
Blodgett Mill Bk
WARREN
WORCESTER COUNTY
BRIMFIELD
4000 AND 5000-FOOT GRID TICKS
INSET B
(Joins lower left)
(Joins sheet 10)
405 000 FEET
455 000 FEET
453 000 FEET
400 000 FEET
WARE
WARREN
WORC
CO
PALMER
HAMPDEN
COUNTY
2000 AND 5000-FOOT GRID TICKS

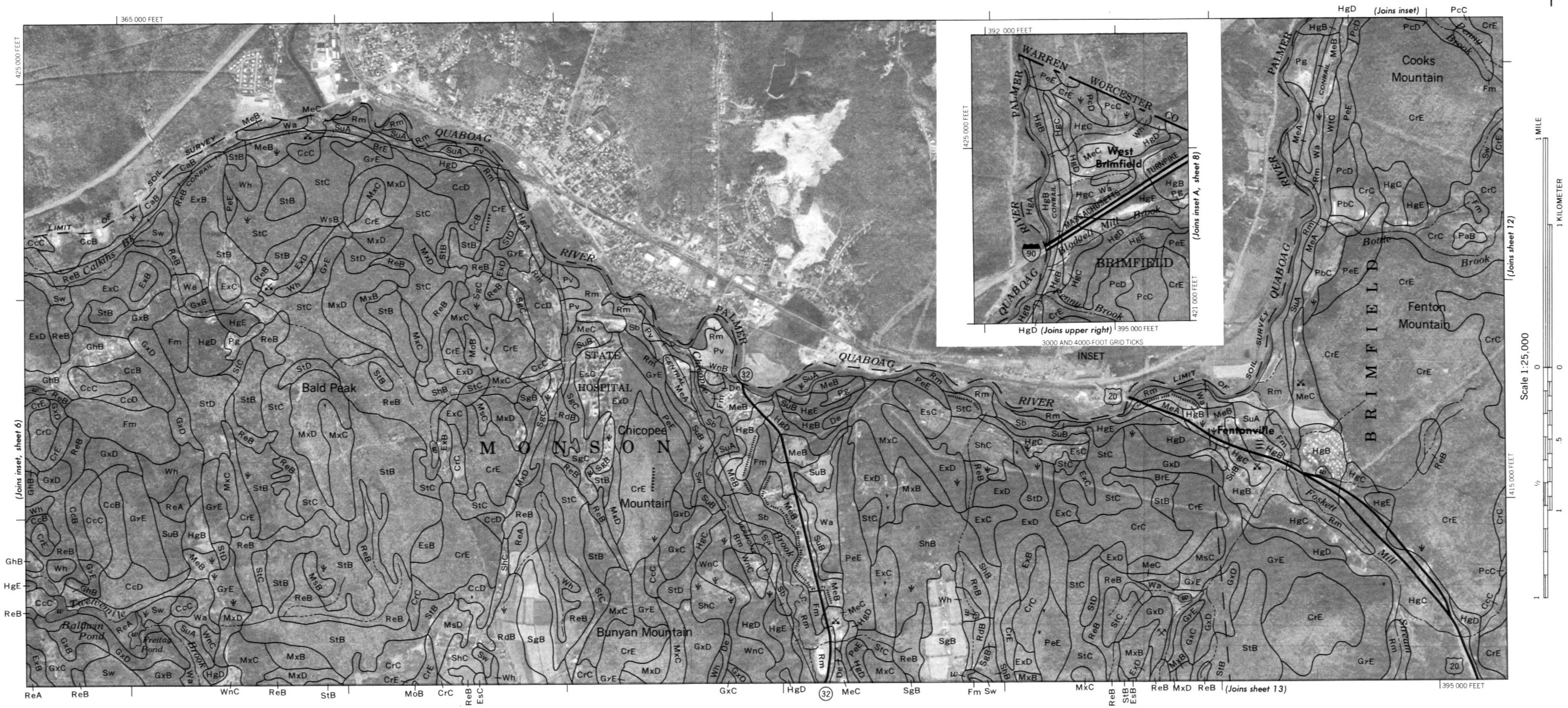
INSET



4000 AND 5000-FOOT GRID TICKS



4000 AND 5000-FOOT GRID TICKS


11
N
365 000 FEET
425 000 FEET
QUABOAG RIVER
PALMER
LIMIT OF SOIL SURVEY
CONRAIL
Calkins Bk
Bald Peak
STATE HOSPITAL
MONSON
Chicopee Mountain
Bunyan Mountain
Baldwin Pond
Twelvemile Brook
Freitag Pond
Conant Brook
Chicopee Brook
Fentonville
Foskett Mill Stream
BRIMFIELD
Cooks Mountain
Fenton Mountain
Bottle Brook
Penny Brook
(Joins inset, sheet 6)
(Joins sheet 12)
(Joins sheet 13)
(Joins inset)
415 000 FEET
395 000 FEET
WARREN
WORCESTER CO
West Brimfield
MASSACHUSETTS TURNPIKE
Blodgett Mill Brook
Mill Brook
Penny Brook
392 000 FEET
421 000 FEET
(Joins inset A, sheet 8)
HgD (Joins upper right)
3000 AND 4000-FOOT GRID TICKS
INSET
Scale 1:25,000
1 MILE
1 KILOMETER

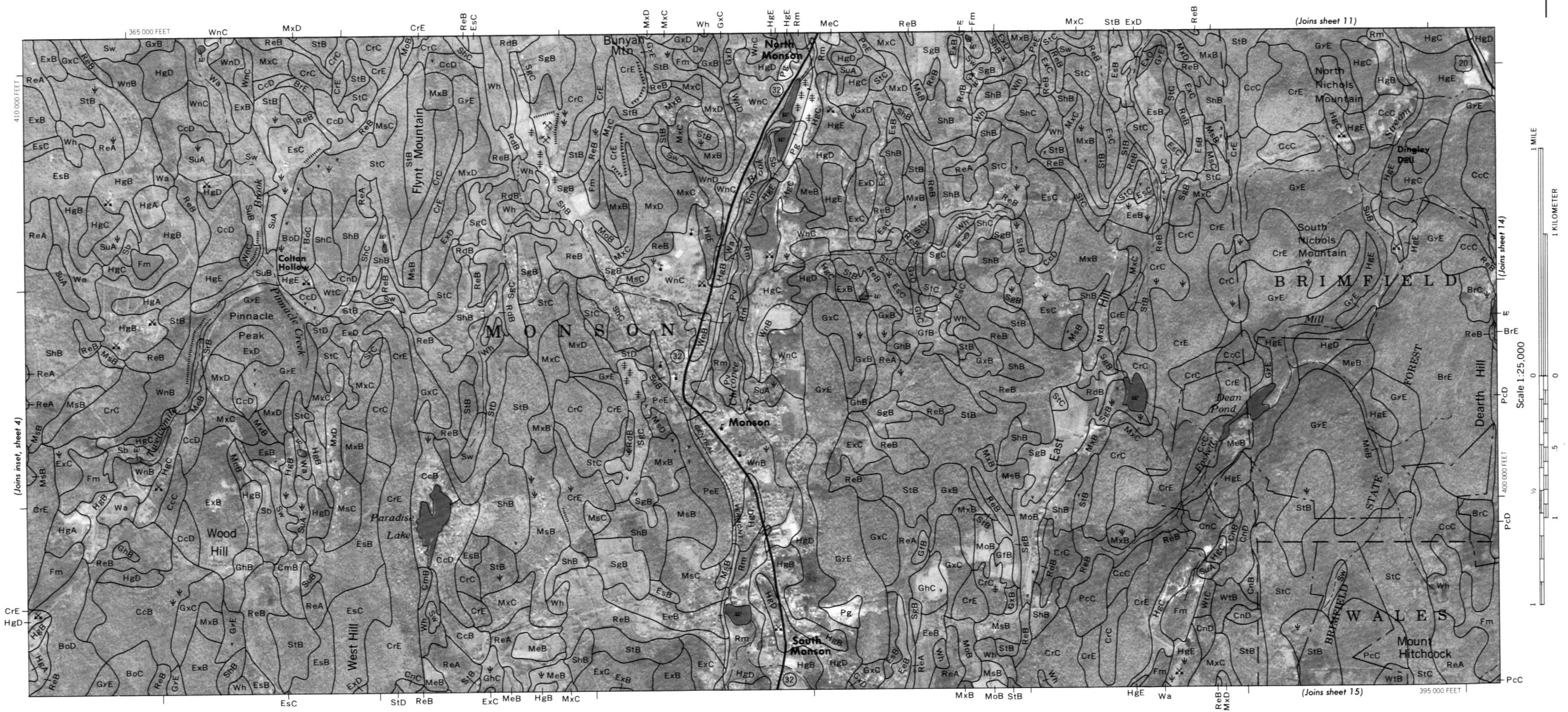
N

Scale 1:25,000

1 MILE

1 KILOMETER

13


N
(Joins sheet 11)
(Joins sheet 14)
(Joins sheet 15)
(Joins inset, sheet 4)
365 000 FEET
410 000 FEET
400 000 FEET
395 000 FEET
Scale 1:25,000
1 MILE
1 KILOMETER
M O N S O N
B R I M F I E L D
W A L E S
North Monson
Monson
South Monson
Bunyan Mtn
Flynt Mountain
Colton Hollow
Pinnacle Peak
Pinnacle Creek
Wood Hill
West Hill
Paradise Lake
Chicopee Brook
North Nichols Mountain
South Nichols Mountain
Dingley Dell
Mill Brook
Dean Pond
East Hill
Dearth Hill
BRIMFIELD STATE FOREST
Mount Hitchcock
CENTRAL VERMONT
32
20

(14)

N

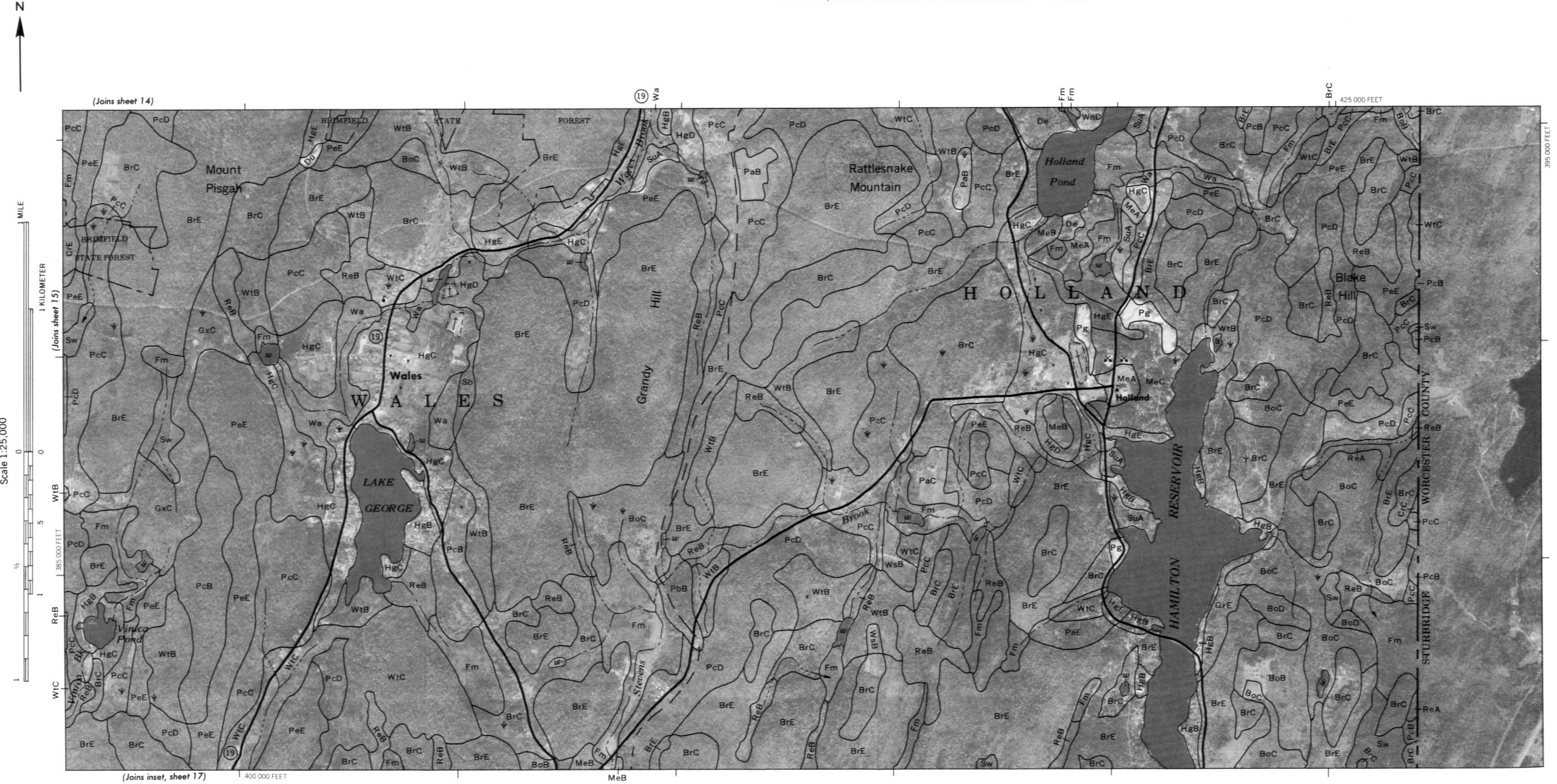
CrE (19) HgB (Joins sheet 12) PcC 430 000 FEET

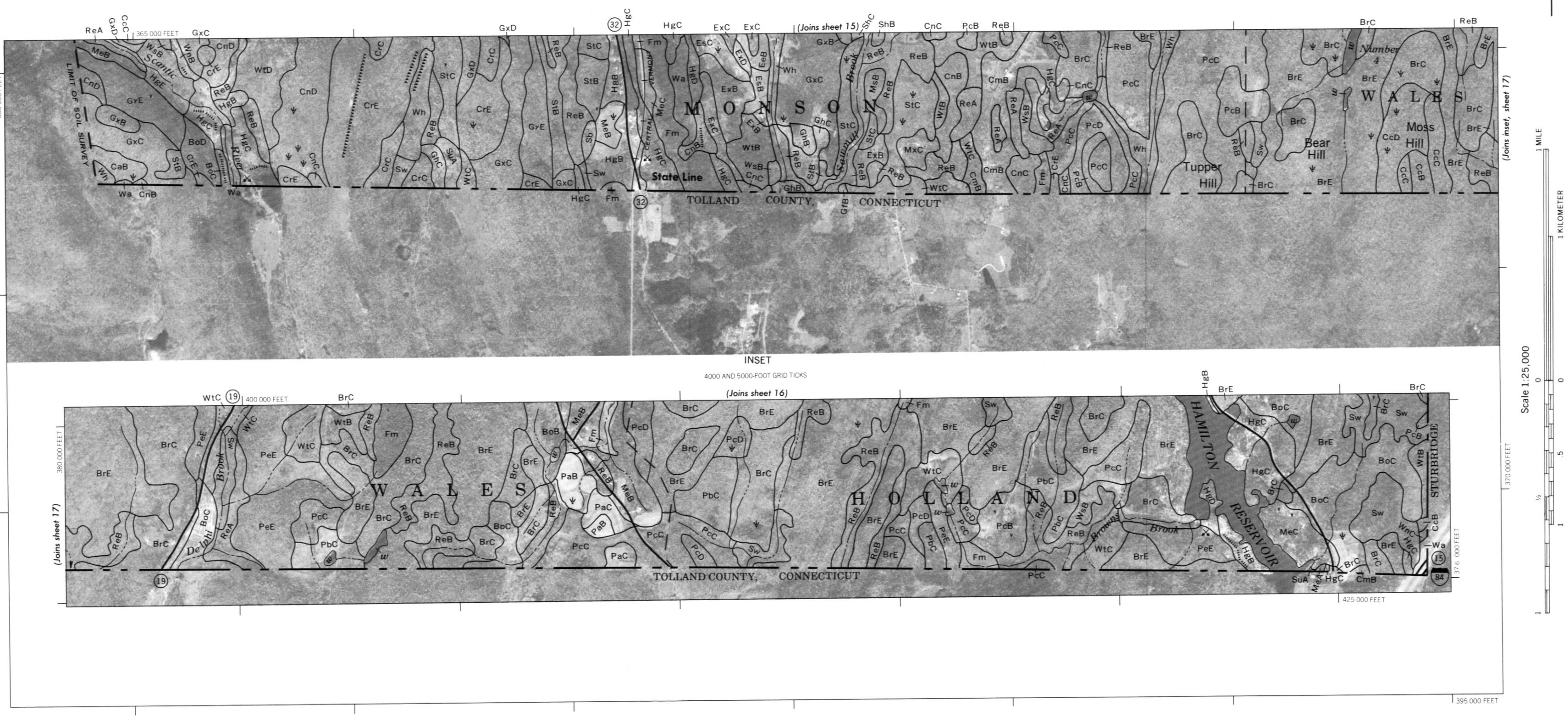
1 MILE 1 KILOMETER (Joins sheet 13) Scale 1:25,000

PcC 400 000 FEET (19) HgB (Joins sheet 16) BrC


N
(Joins sheet 13)
(Joins sheet 16)
(Joins sheet 17)
365 000 FEET
390 000 FEET
385 000 FEET
395 000 FEET
Scale 1:25,000
1 MILE
1 KILOMETER
LIMIT OF SOIL SURVEY
HAMPDEN
M O N S O N
W A L E S
Moon Mountain
West Hill
Bradley Pond
Calkins Pond
Temple
Boulder Hill Pond
Peaked Mountain
Chicopee Brook
Smith Pond
CENTRAL VERMONT
Conant Brook
Conant Brook Reservoir
DAM
Duck Pond
Squire Pond
Cedar Swamp
Peck Hill
Sawmill Brook
Moulton Hill
BRIMFIELD STATE FOREST
STATE FOREST
Vinica Brook
Norcross Brook
Number 1
Number 2
Number 3
Number 4
Ponds
32

SOIL SURVEY OF HAMPDEN AND HAMPSHIRE COUNTY, MASSACHUSETTS EASTERN PART — SHEET NUMBER 16




17
N
(Joins sheet 15)
(Joins inset, sheet 17)
LIMIT OF SOIL SURVEY
M O N S O N
W A L E S
State Line
TOLLAND COUNTY, CONNECTICUT
Tupper Hill
Bear Hill
Moss Hill
Number 4
Scantic River
Sawmill Brook
365 000 FEET
INSET
4000 AND 5000-FOOT GRID TICKS
(Joins sheet 16)
(Joins sheet 17)
W A L E S
H O L L A N D
HAMILTON RESERVOIR
STURBRIDGE
Delphi Brook
Browns Brook
400 000 FEET
380 000 FEET
370 000 FEET
376 000 FEET
425 000 FEET
395 000 FEET
Scale 1:25,000
1 MILE
1 KILOMETER